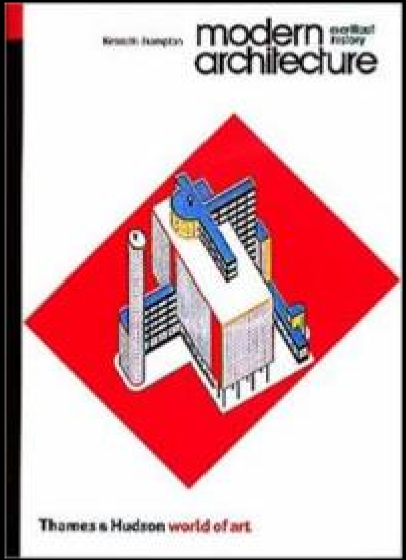
The Architecture of Assembly:

The Advent of Industrialized Construction Methods and the Impact on the Design Process



causes of the change in the way of building things…

"cultural transformations"
human ability to exercise control over nature

"territorial transformations"
increase in population and general
urbanization and demand for buildings

"technical transformations"
advances in mathematics, physics and structural engineering

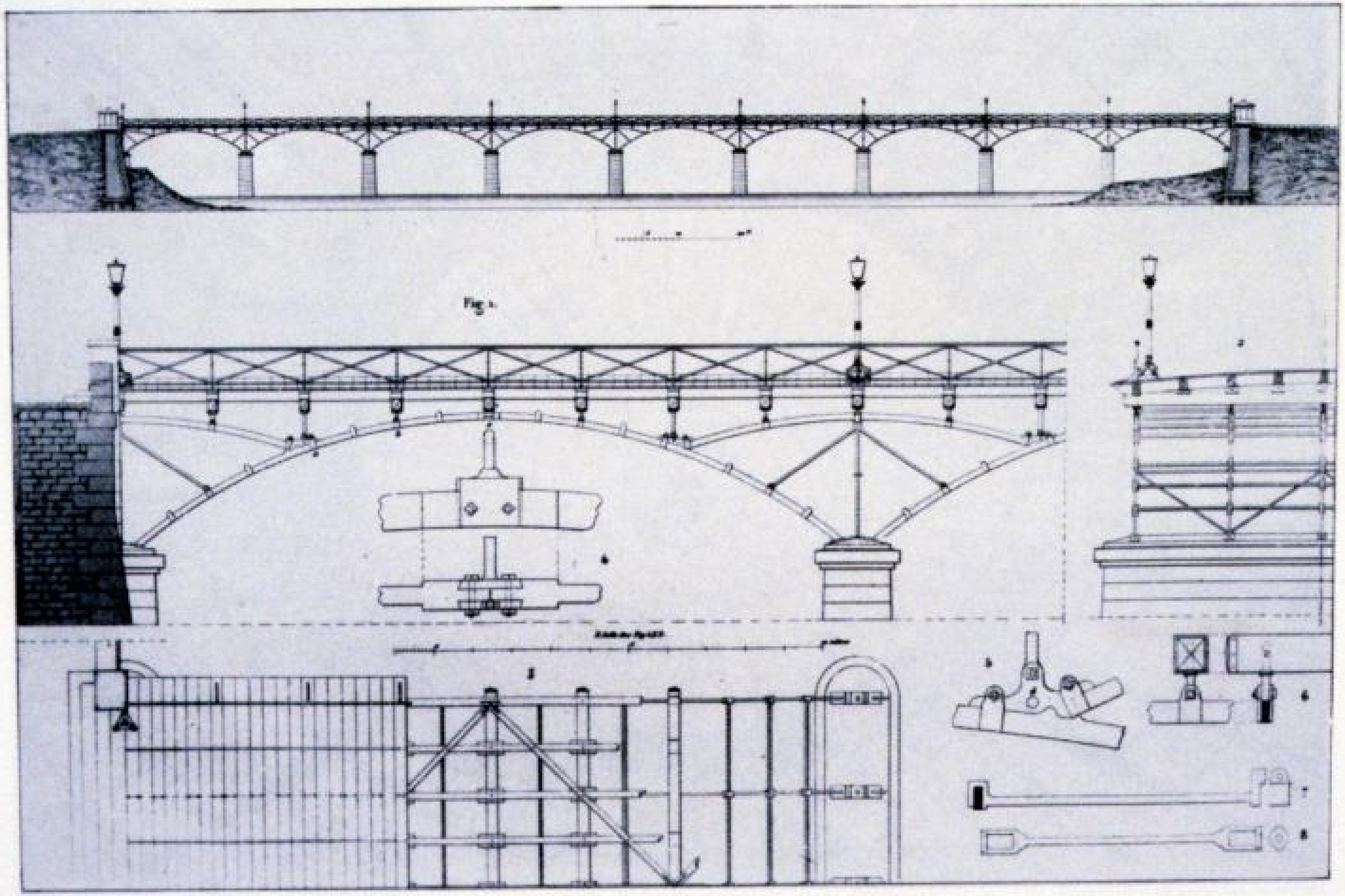


Plate 7. Delon de Cessart and Dillon. Pont des Arts, Paris, 1803 (Rondelet, *L'Art de bâtir*, pl. 159)

Pont des Arts
Louis-Alexandre de Cesart and Jacques Dillon
Paris, France
1804
original 9 arch bridge rebuilt 1984 with 7 arches

Bourse de Commerce
Paris, France
Francois-Joseph Belanger
Iron dome 1811

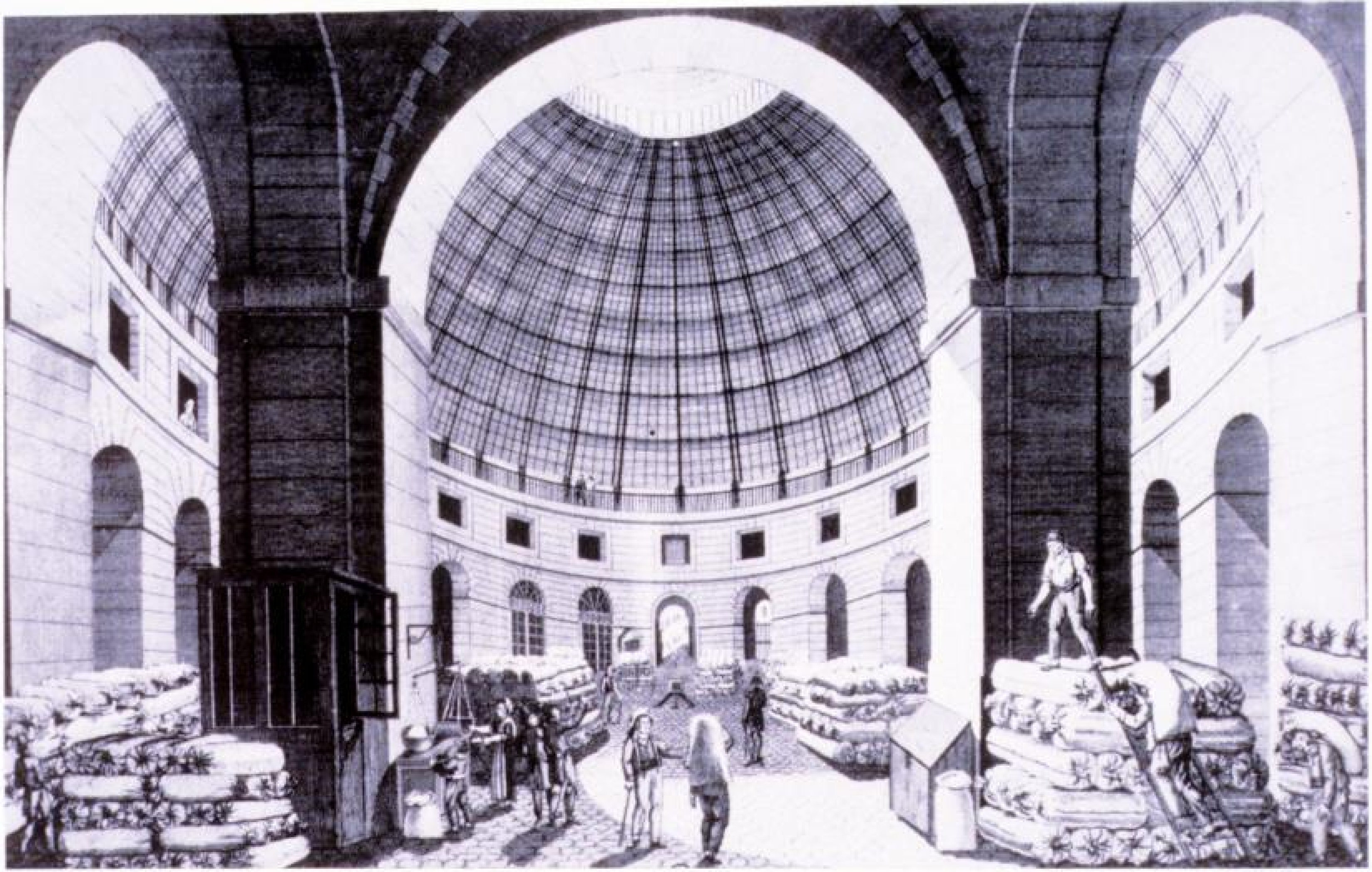


Plate 19. Passage des Princes, Paris, 1860 (Frances H. Steiner)

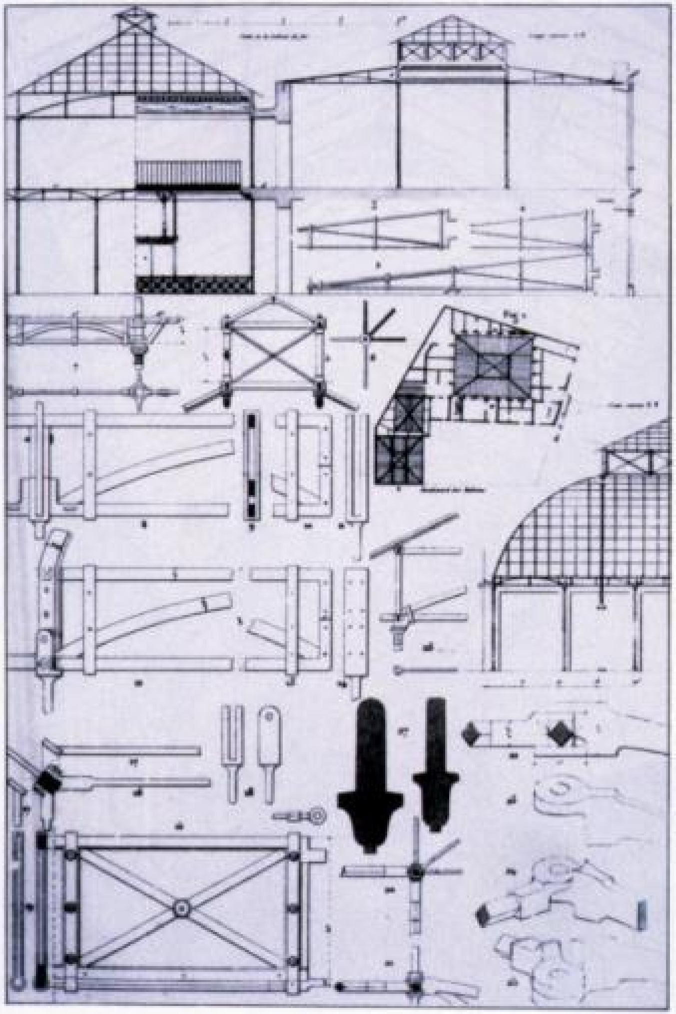
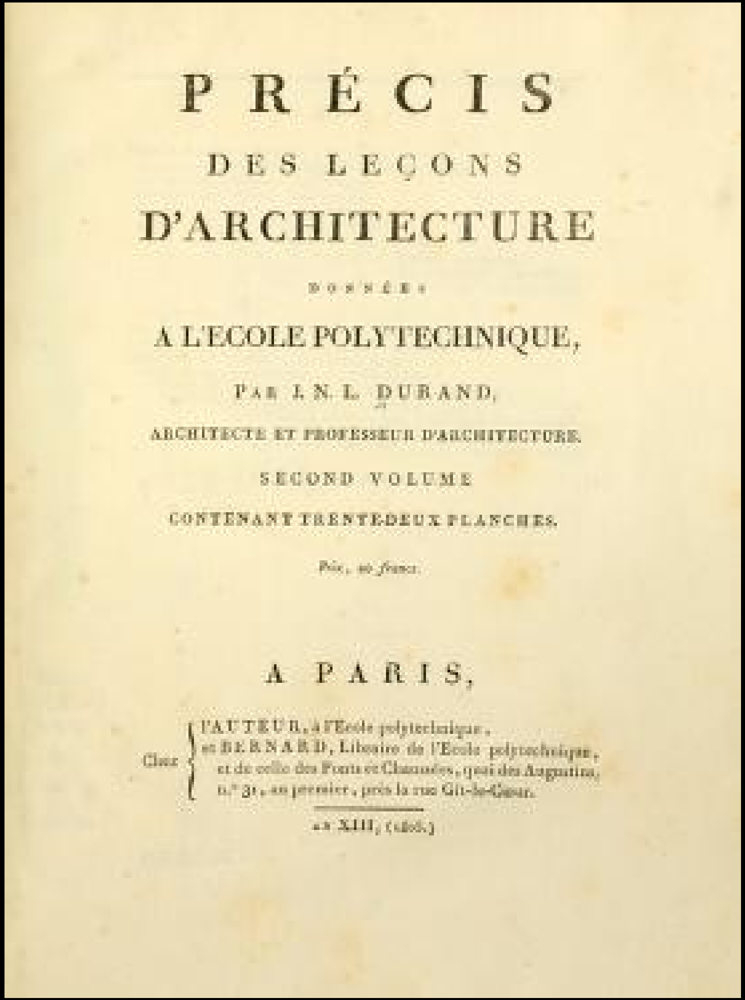


Plate 20. Tavernier. Galerie de Fer, Paris, 1829 (Thiollet, 1832, pl. 26)

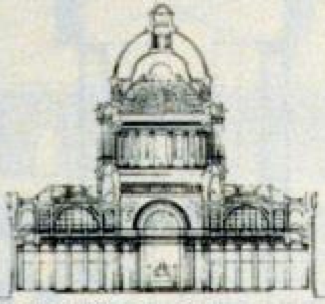

PRÉCIS
DES LEÇONS
D'ARCHITECTURE
DONNÉES
A L'ECOLE POLYTECHNIQUE,
PAR J. N. L. DURAND,
ARCHITECTE ET PROFESSEUR D'ARCHITECTURE.
SECOND VOLUME
CONTENANT TRENTE-DEUX PLANCHES.
Prix, [illegible] francs.

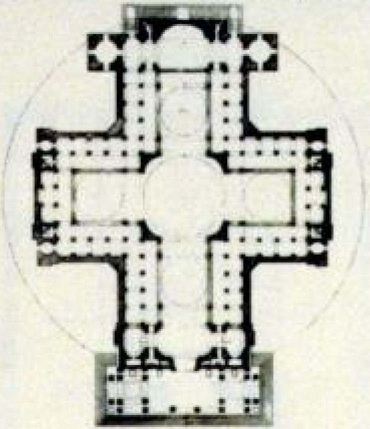
A PARIS,
Chez l'AUTEUR, à l'École polytechnique,
et BERNARD, Libraire de l'École polytechnique,
et de celle des Ponts et Chaussées, quai des Augustins,
n.° 31, au premier, près la rue Gît-le-Cœur.

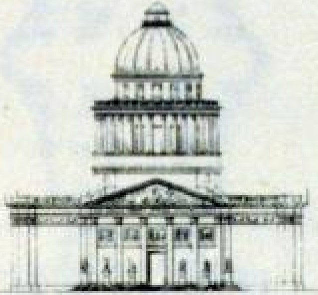
AN XIII, ([illegible])

Jean-Nicolas-Louis Durand
French Architect
1760 - 1834

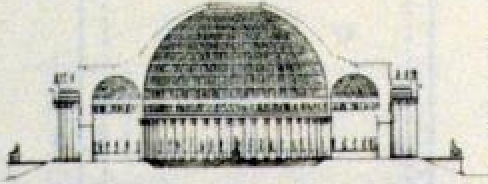
EXEMPLE DES AVANTAGES QUE PROCURENT A LA SOCIÉTÉ
la connoissance et l'observation des vrais Principes de l'Architecture.

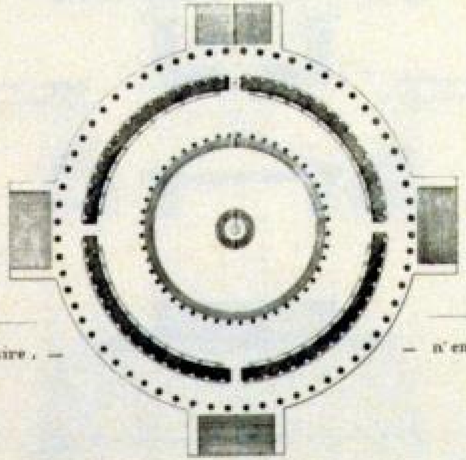


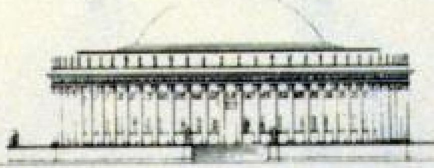




Eglise de Ste Genevieve, ou Panthéon Français, tel qu'il est. — — Cet Edifice quoi qu'assez resserré, a couté dix huit millions.



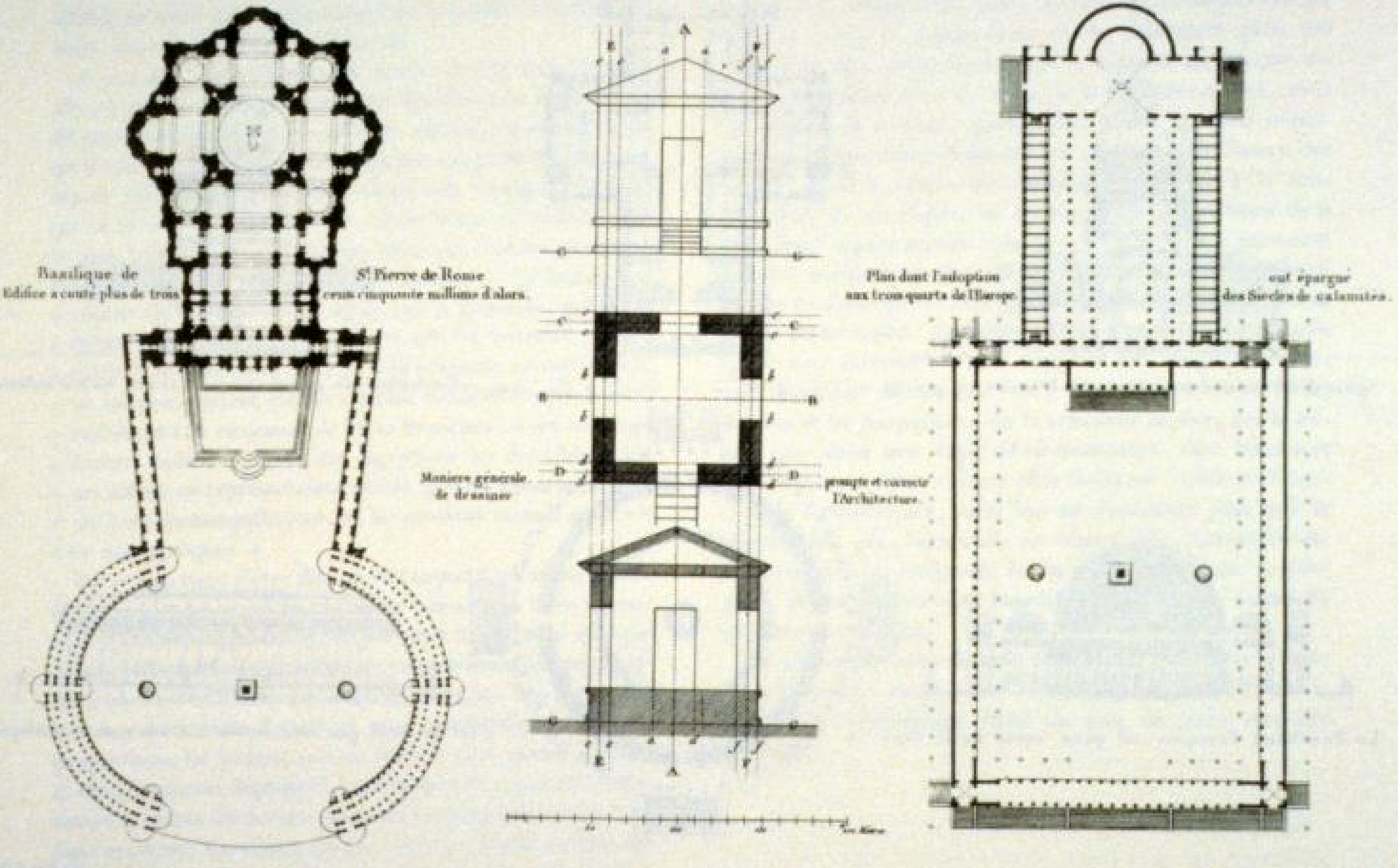




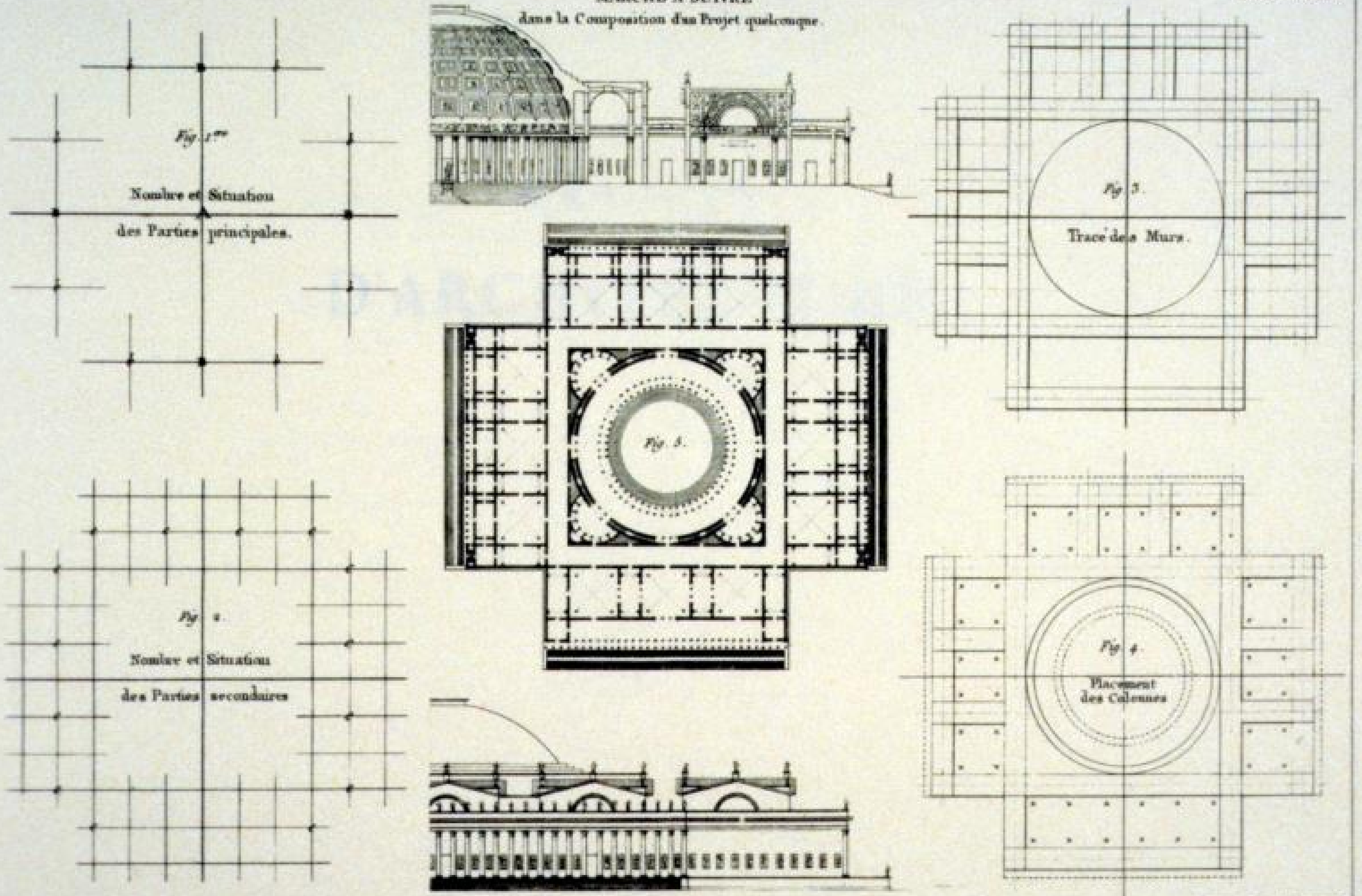
Le Panthéon Français, tel qu'on auroit du le faire. — — n'en eut couté que neuf, et eut été vaste et magnifique.

Gravé par C. Normand

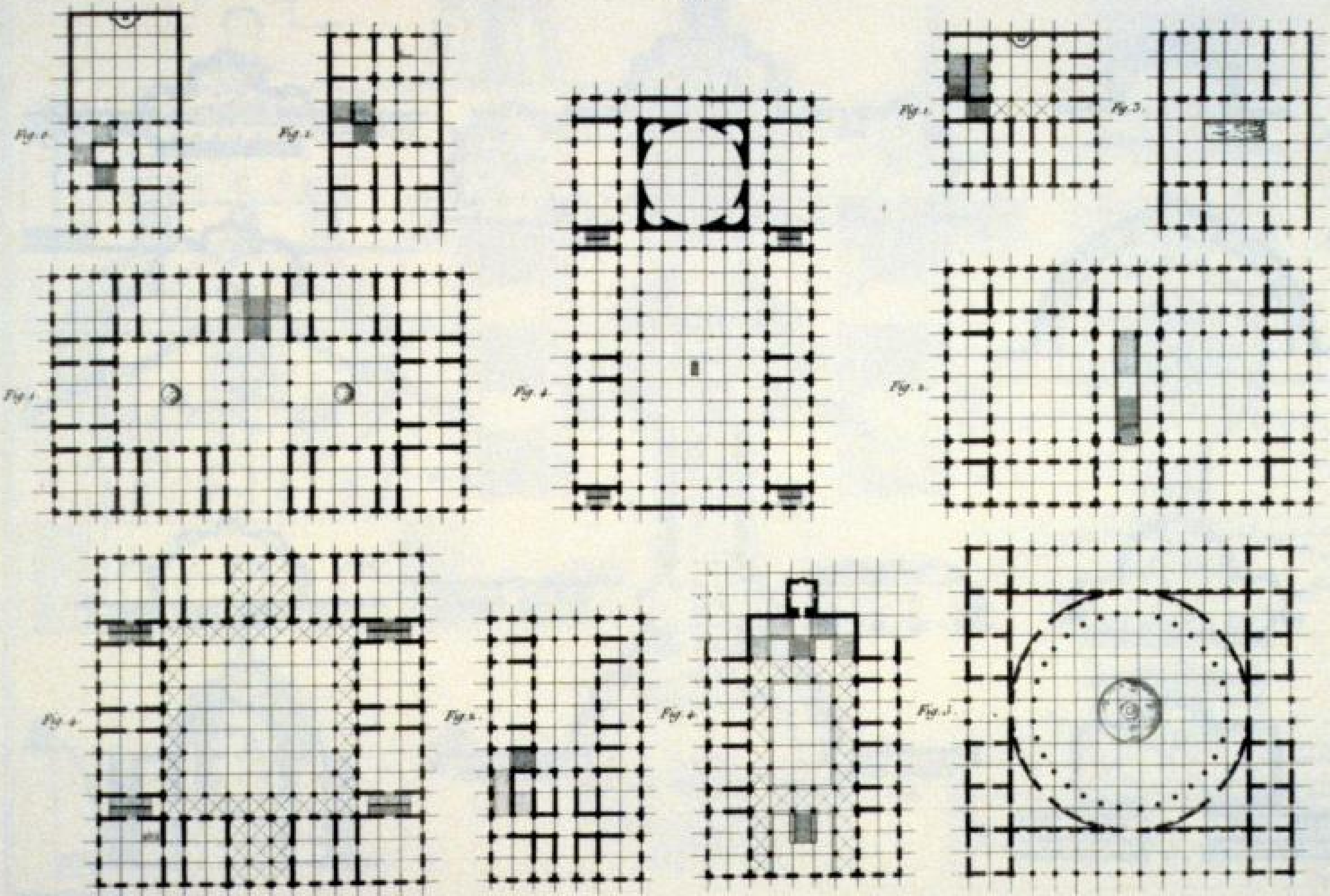
EXEMPLE DES FUNESTES EFFETS
qui résultent de l'ignorance ou de l'inobservation des vrais Principes de l'Architecture.



MARCHE À SUIVRE
dans la Composition d'un Projet quelconque

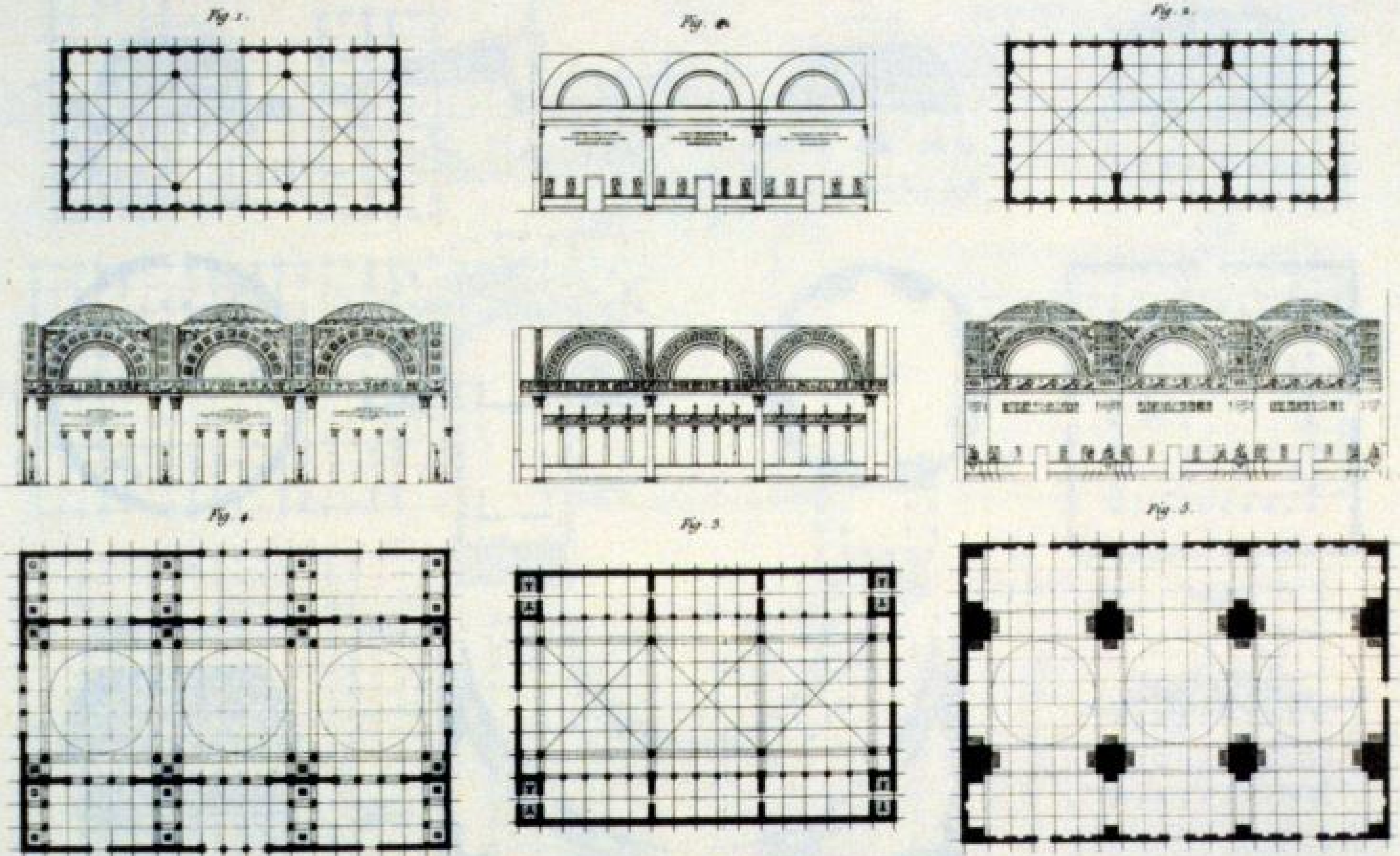


COURS



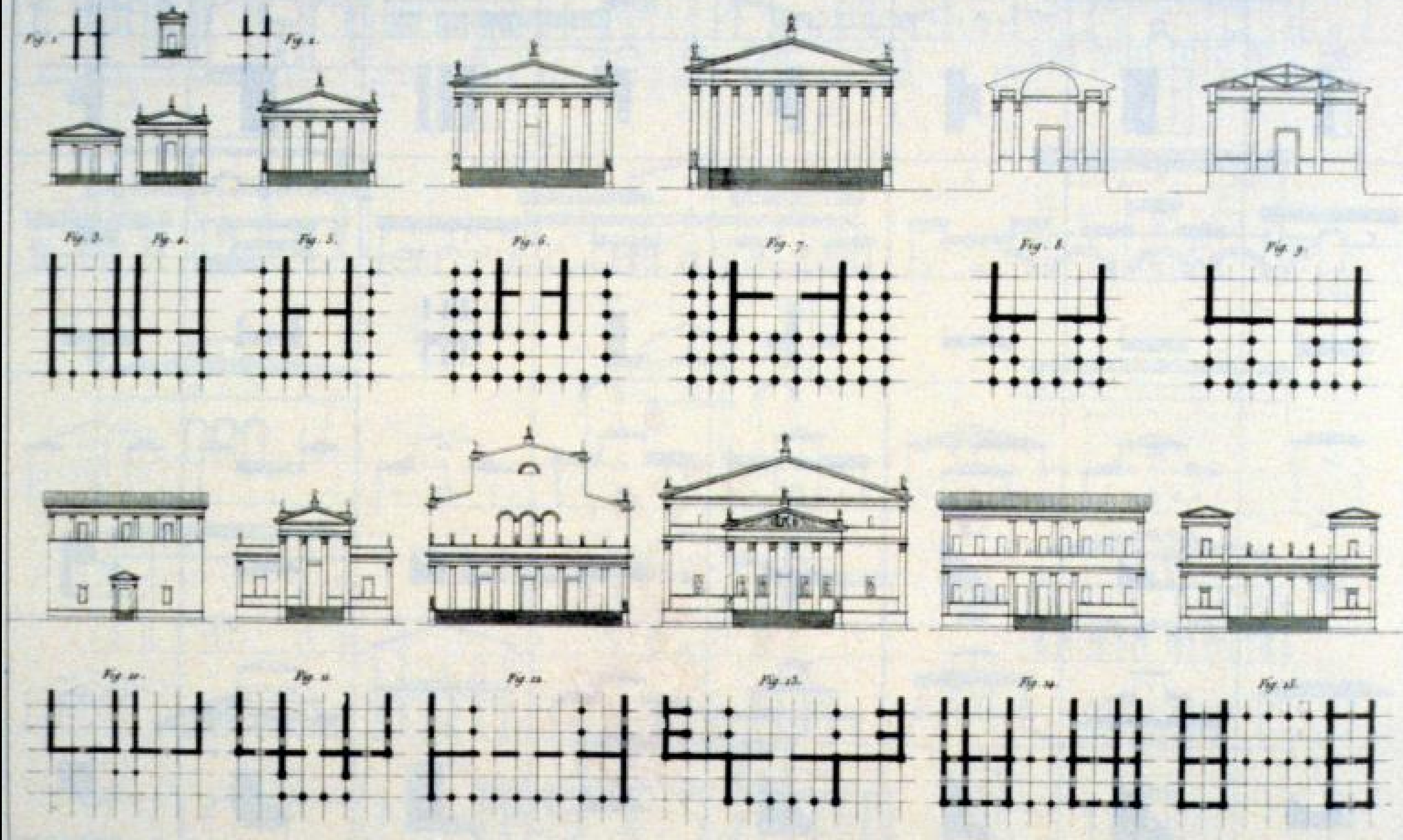
Gravé par C. Normand

SALLES.



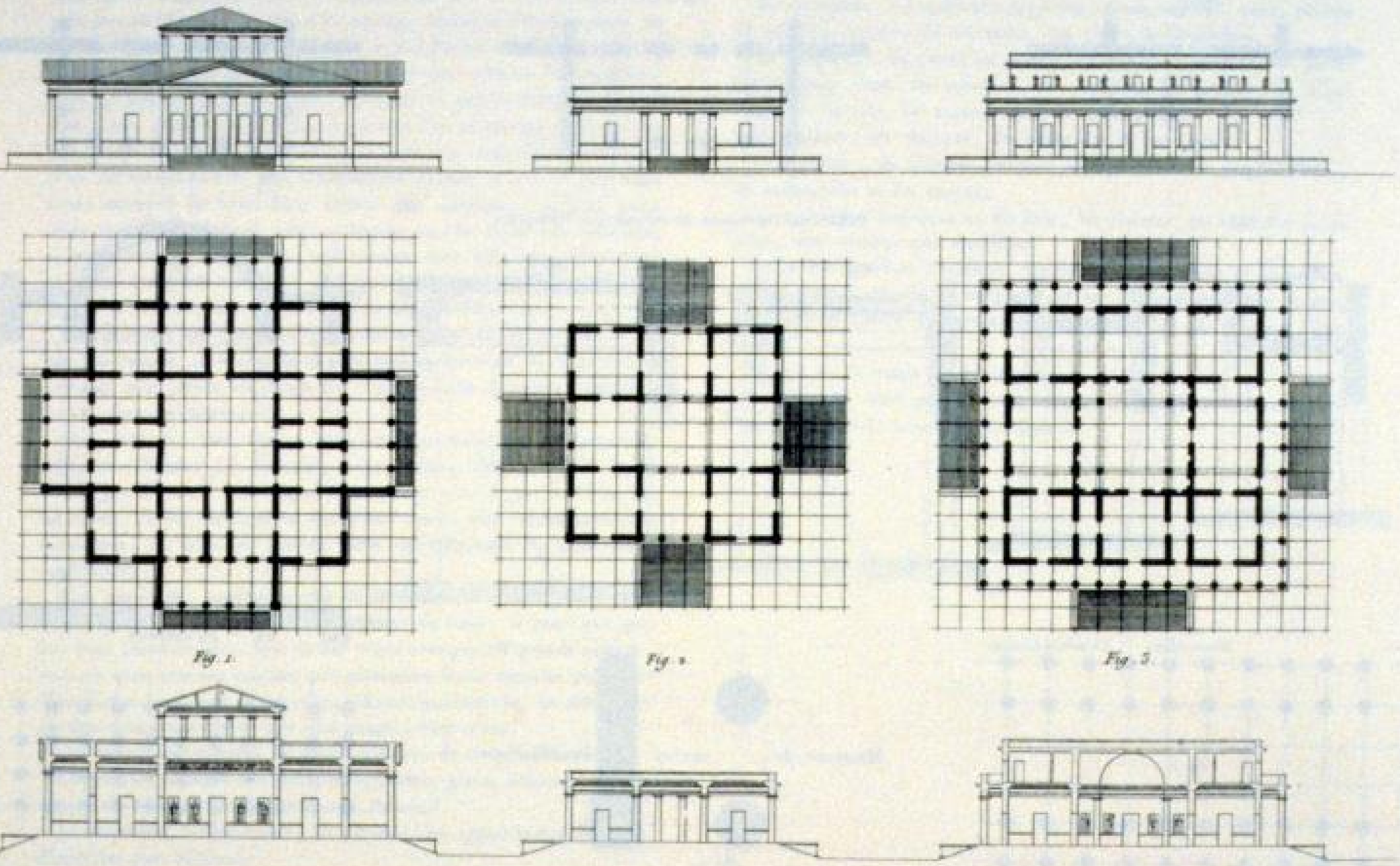
Gravé par C. Normand

PORCHES
ouverts par des entrecolonnements.



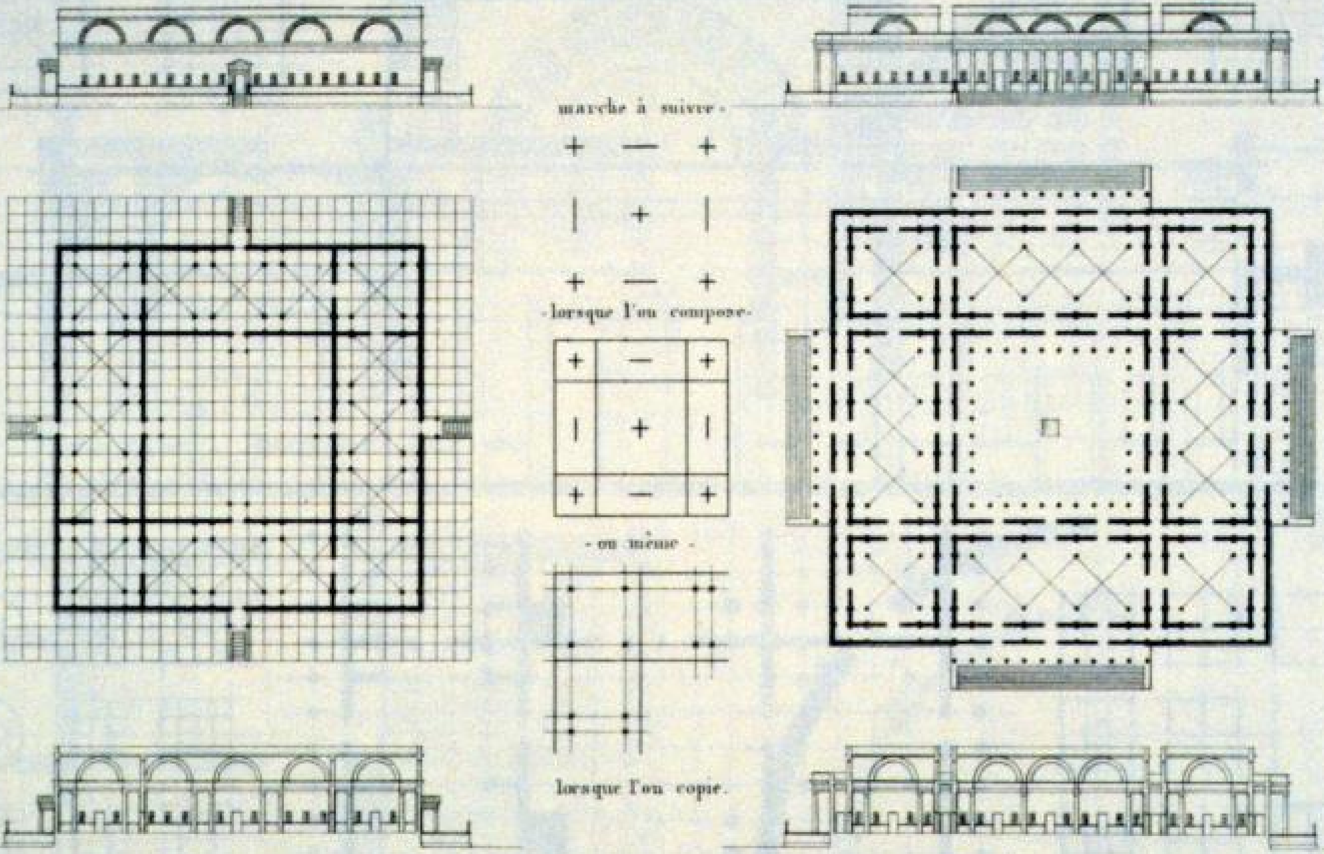
Combinaisons horisontales,

de Colonnes, de Pilastres, de Murs, de Portes et de Croisées.



ENSEMBLES D'ÉDIFICES

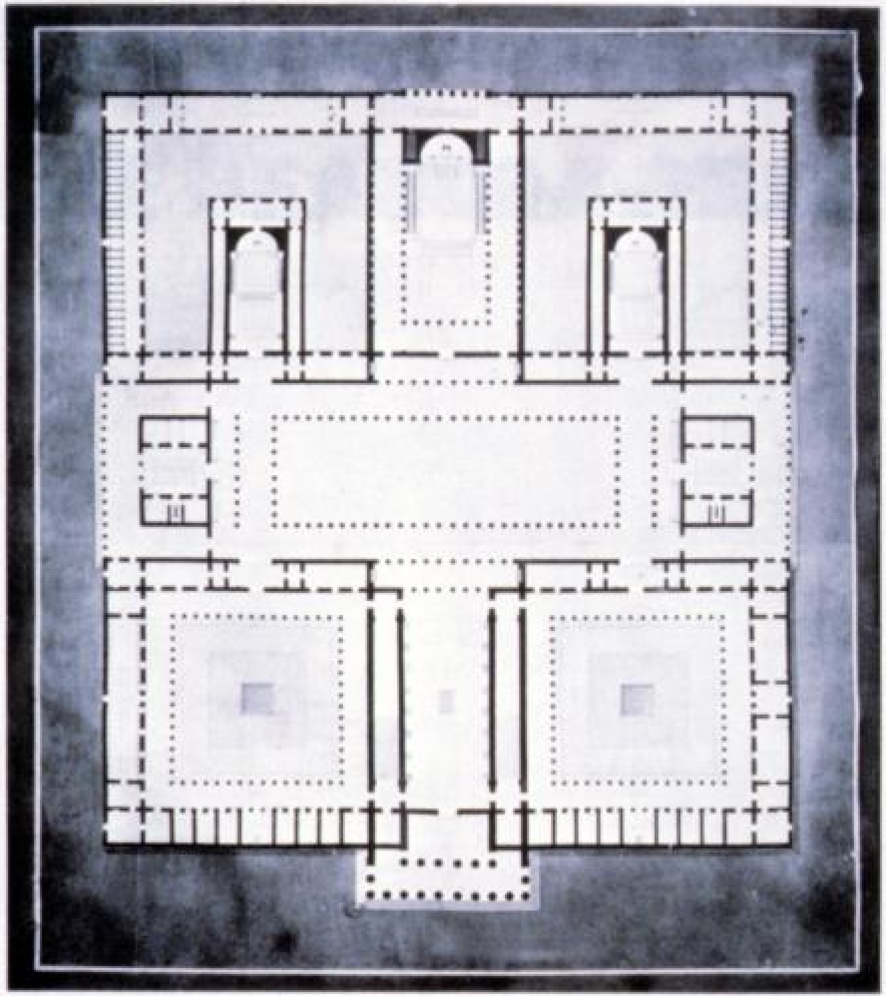
formés par la combinaison de parties de cinq entr'axes de largeur.



Gravé par C. Normand

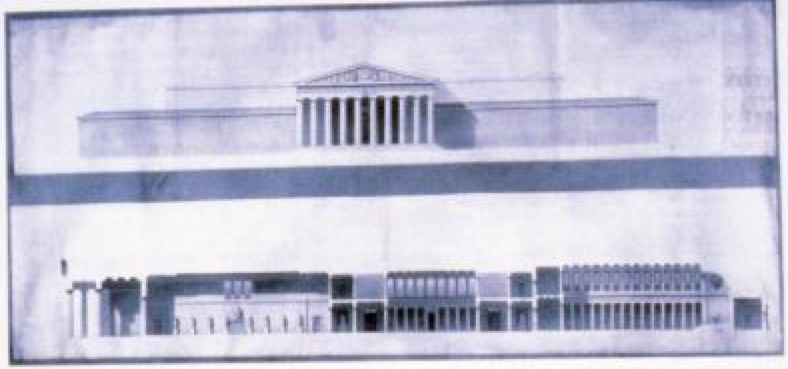
Henri Labrouste
Ecole des Beaux Arts
1801 to 1895

Structural Rationalism

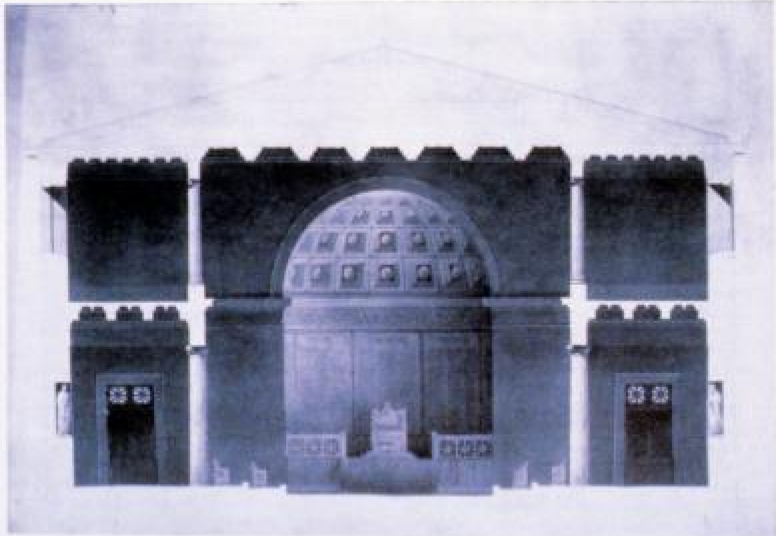


3 Henri Labrouste, plan of the Tribunal de Cassation, 1er Grand Prix, 1824

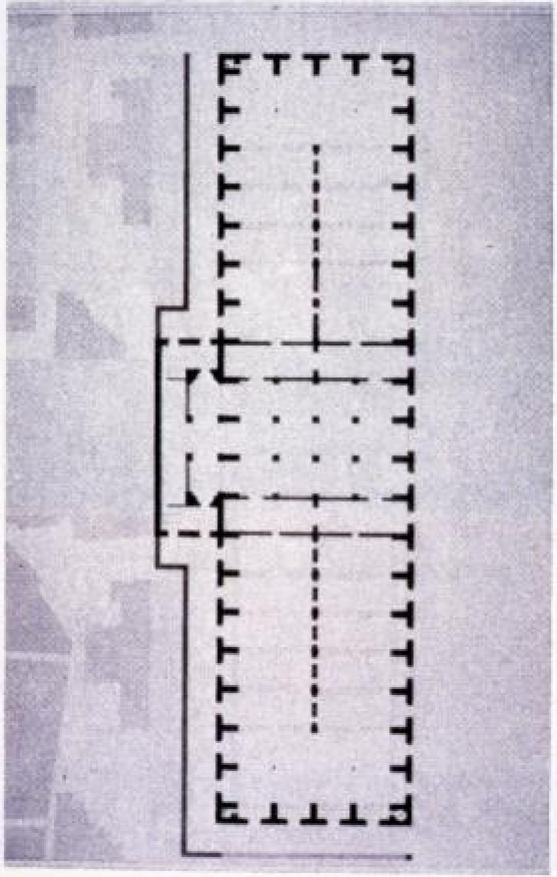
3 Henri Labrouste, plan du Tribunal de Cassation, 1er Grand Prix, 1824.

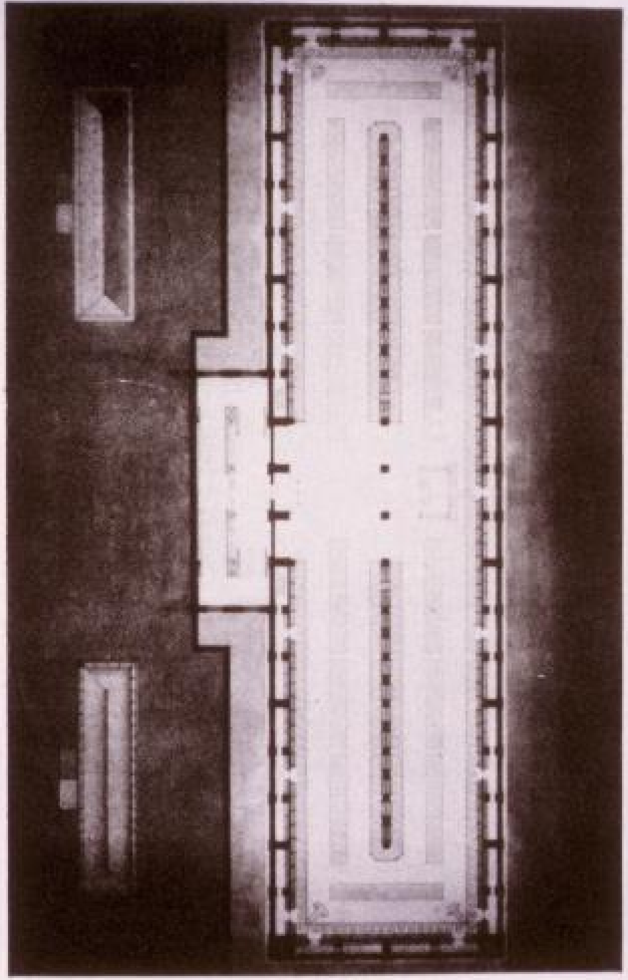


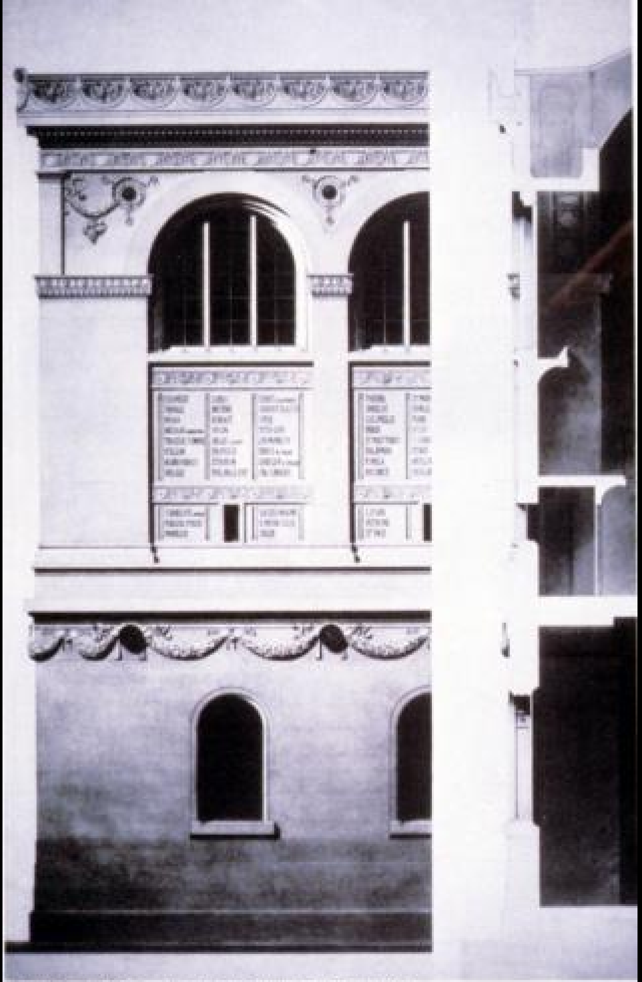
84, 85 H. Labrouste. Cour de Cassation, 1824: rendered elevation and longitudinal section (above), and rendered cross-section of main courtroom. (Beaux-Arts)



Henri Labrouste's Bibliothèque Sainte-Geneviève, Paris, 1838-50

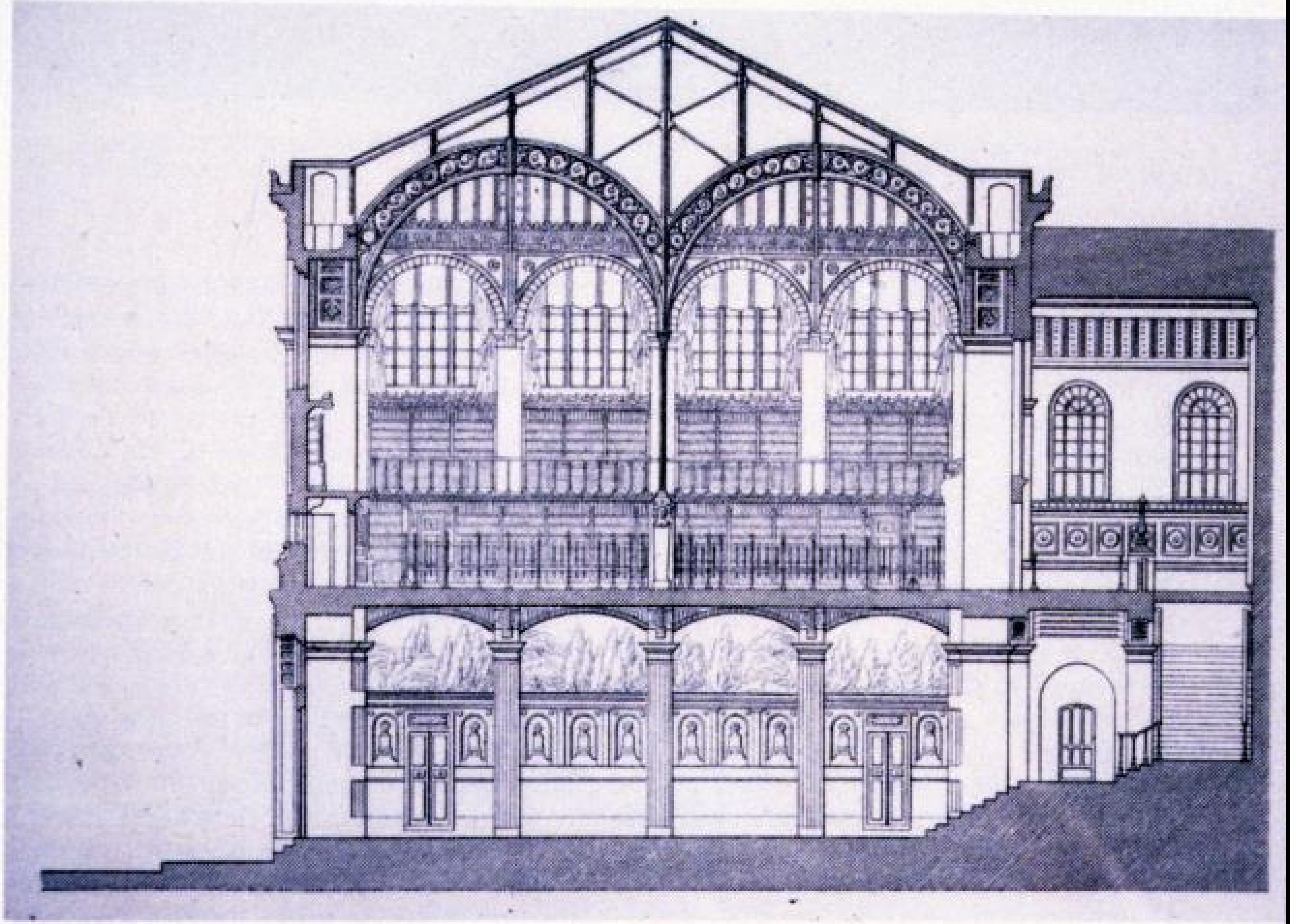


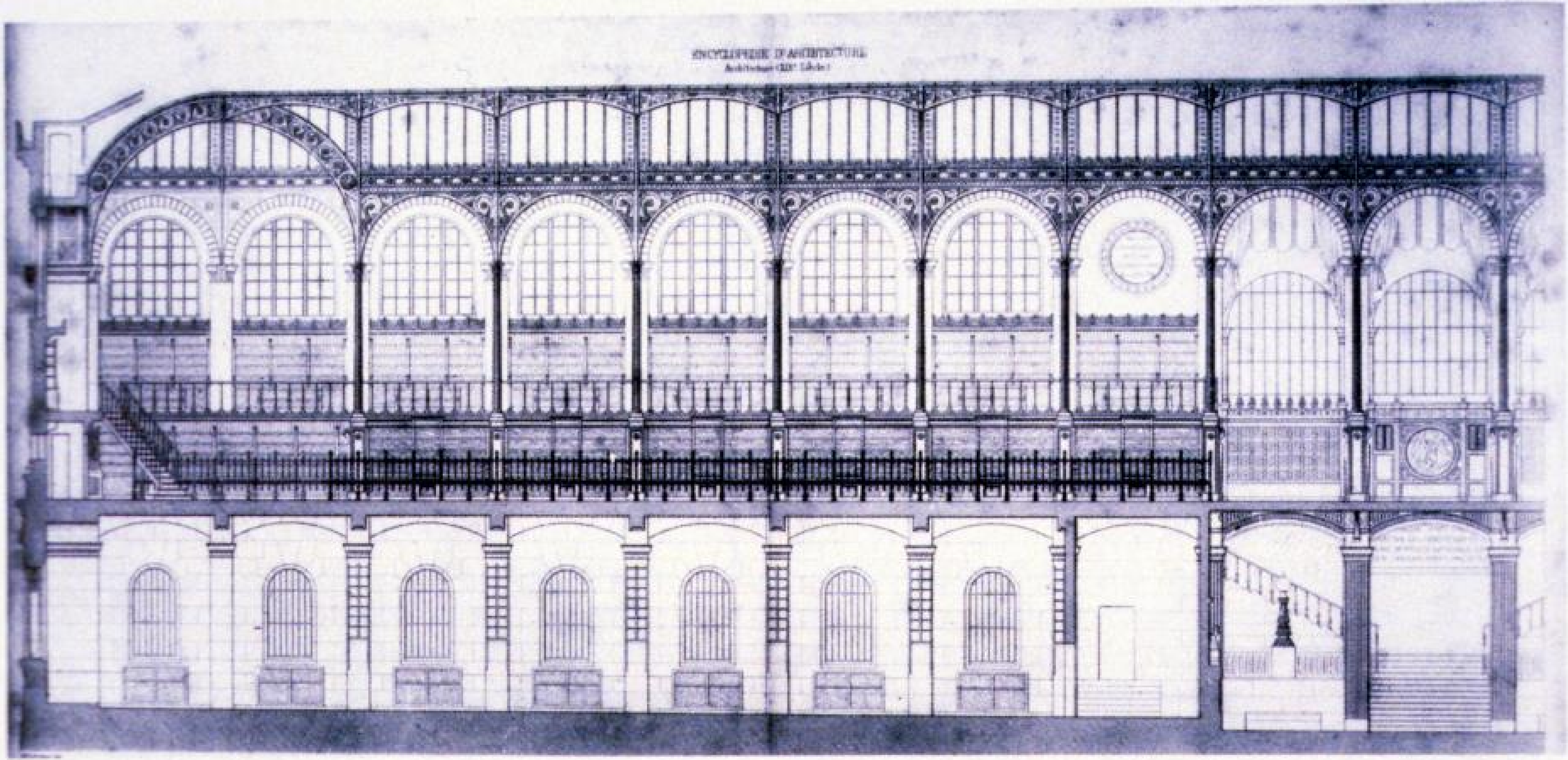




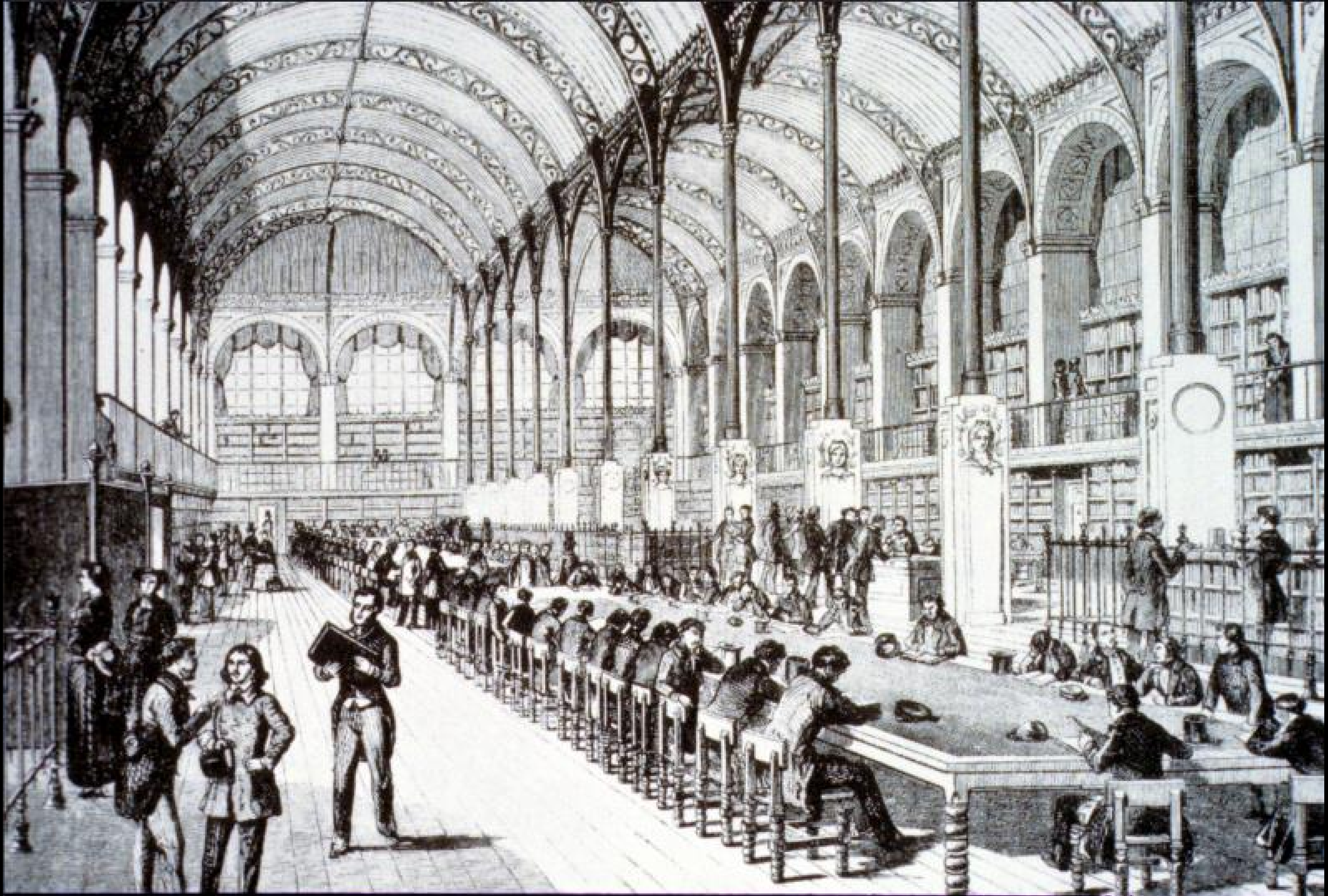
Bibliothèque Sainte-Geneviève d'Henri Labrouste à Paris (1838-50)

144 Bibliothèque Ste-Geneviève: transverse section. (From Gourlier et al., *Choix d'édifices publics*, III, 1850)





143 Bibliothèque Ste-Geneviève: longitudinal section of western half. Engraved after a drawing by Labrouste. (From the *Encyclopédie d'architecture*, V, 1855)



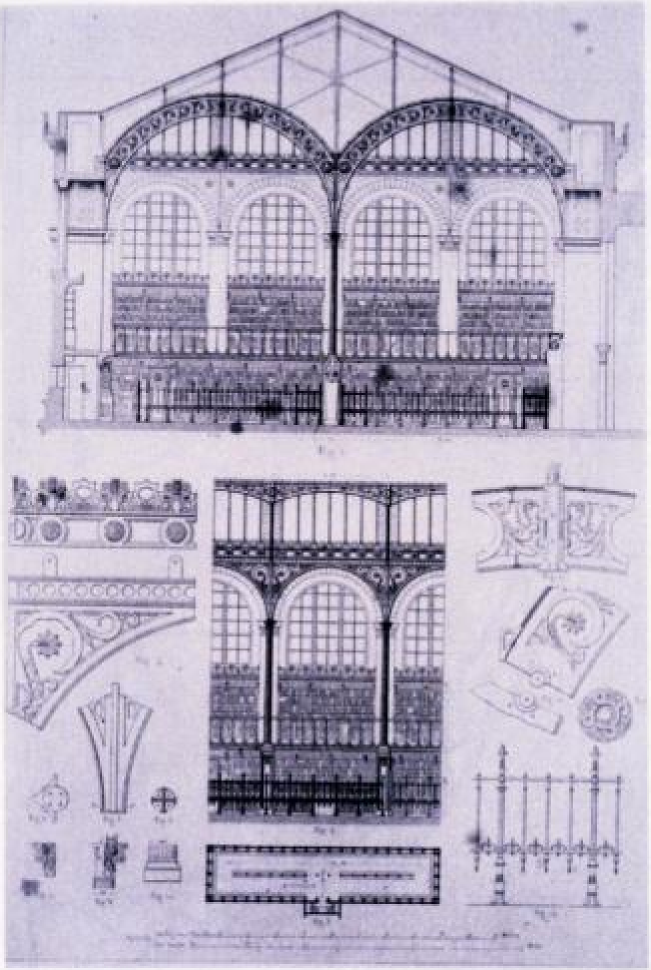
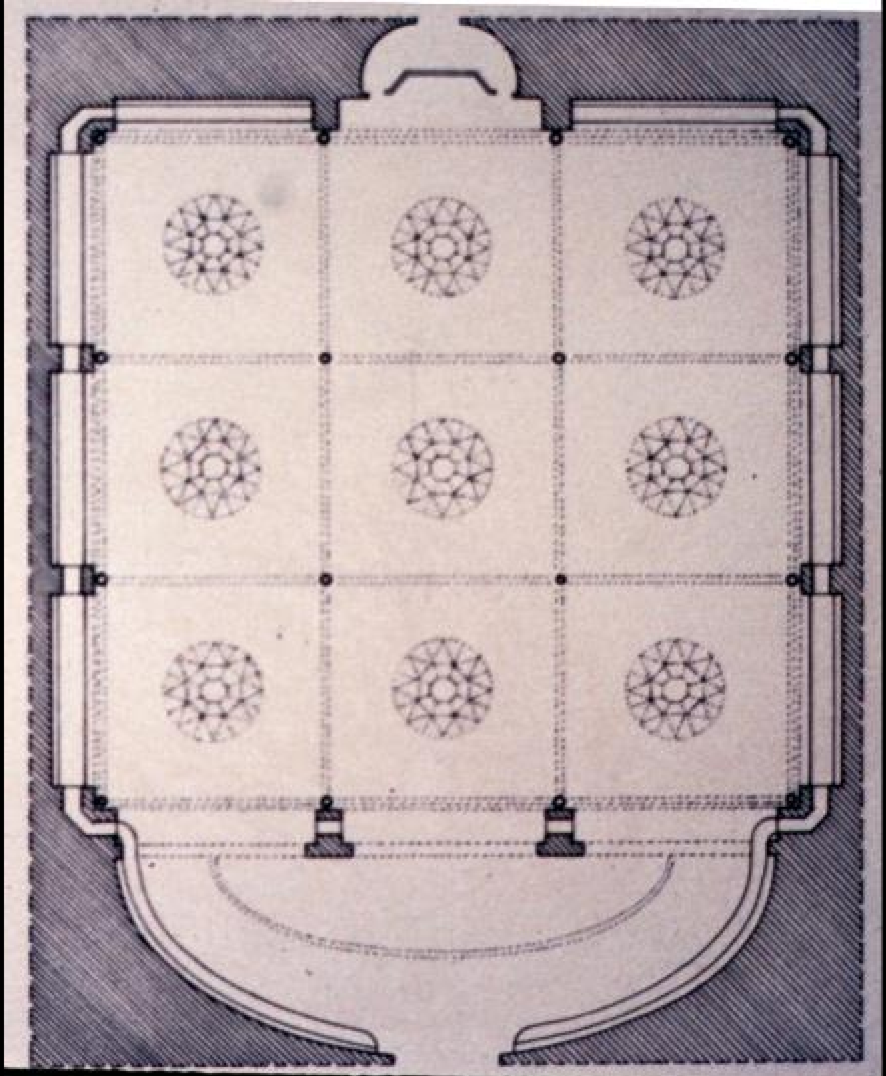
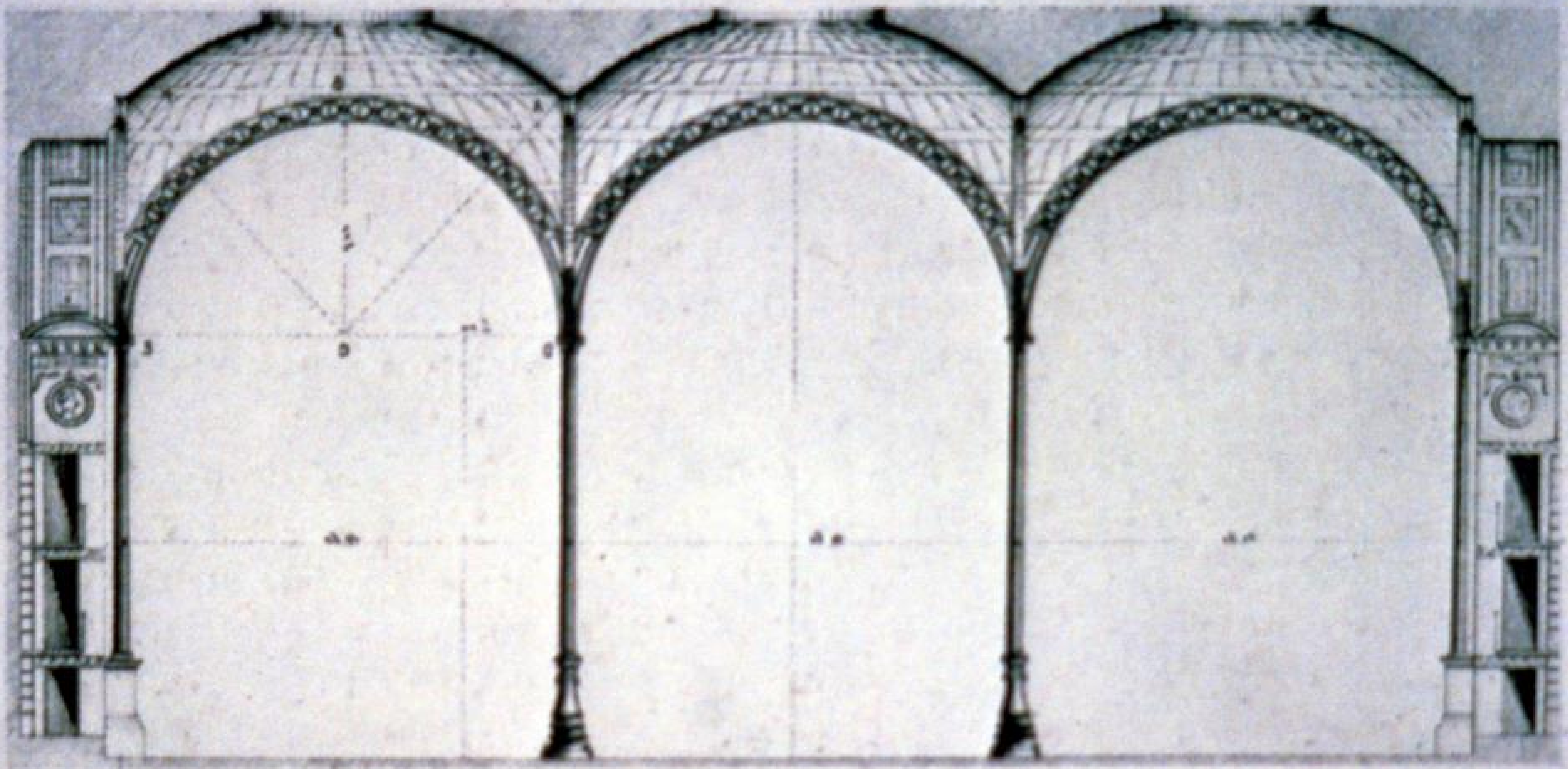
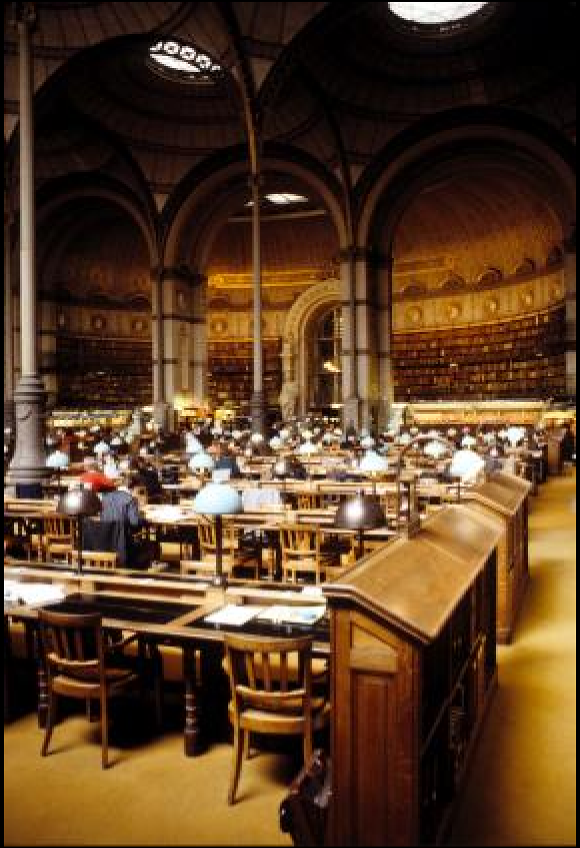


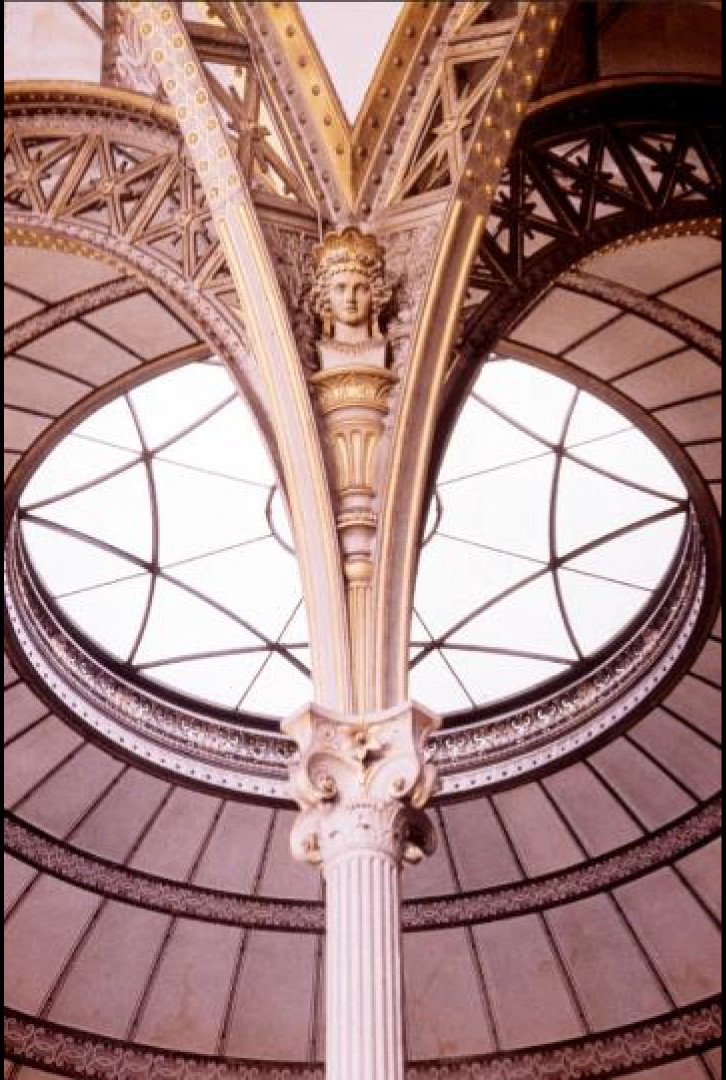
Plate 44. Henri Labrouste, Bibliothèque Saint-Geneviève, Paris, 1843-50. Section, plan and details (Reynaud, 1860-63, Pl. 80)



Biblioteque Nationale de France
Paris, France
Henri Labrouste
1962 to 1868



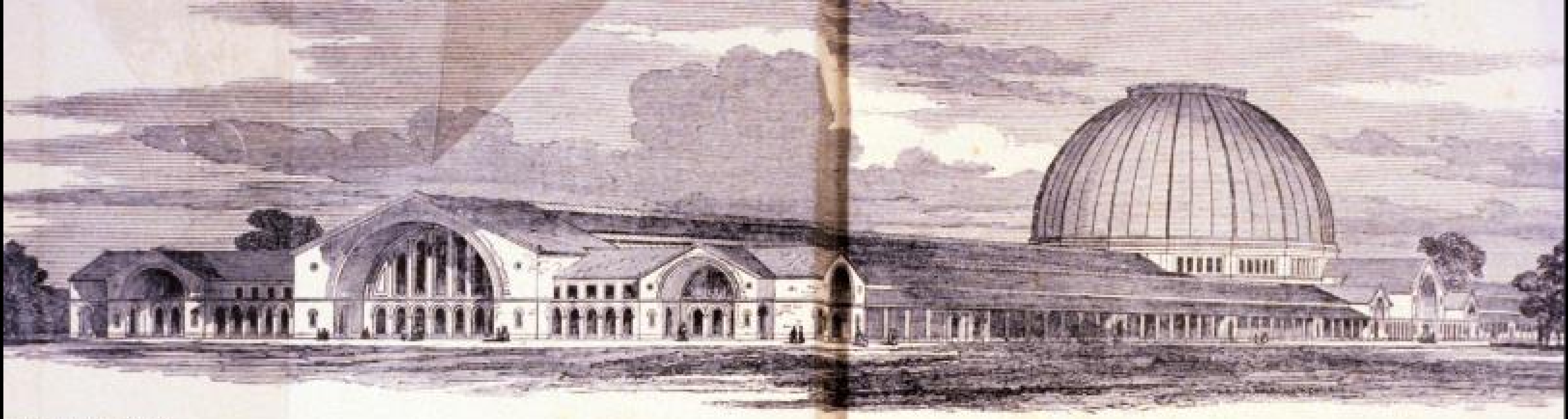




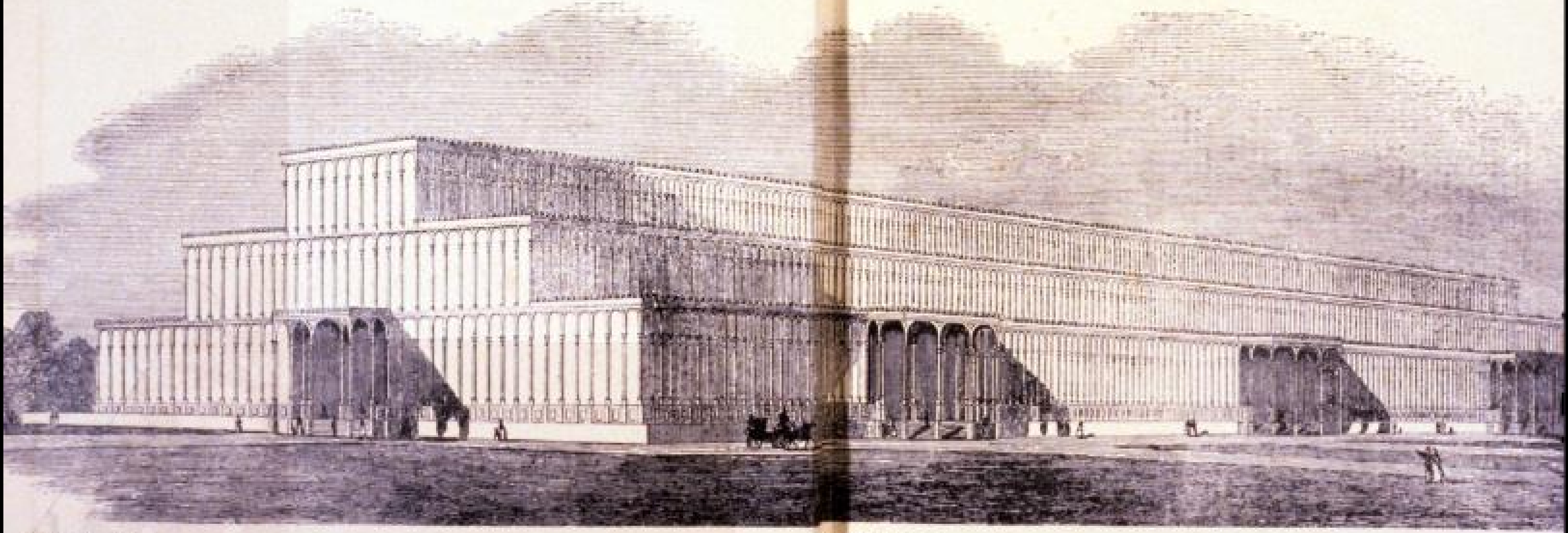
The Great Exhibition 1851
Hyde Park, London, England

Sir Joseph Paxton

The Great Exhibition 1851
Hyde Park, London, England
Sir Joseph Paxton

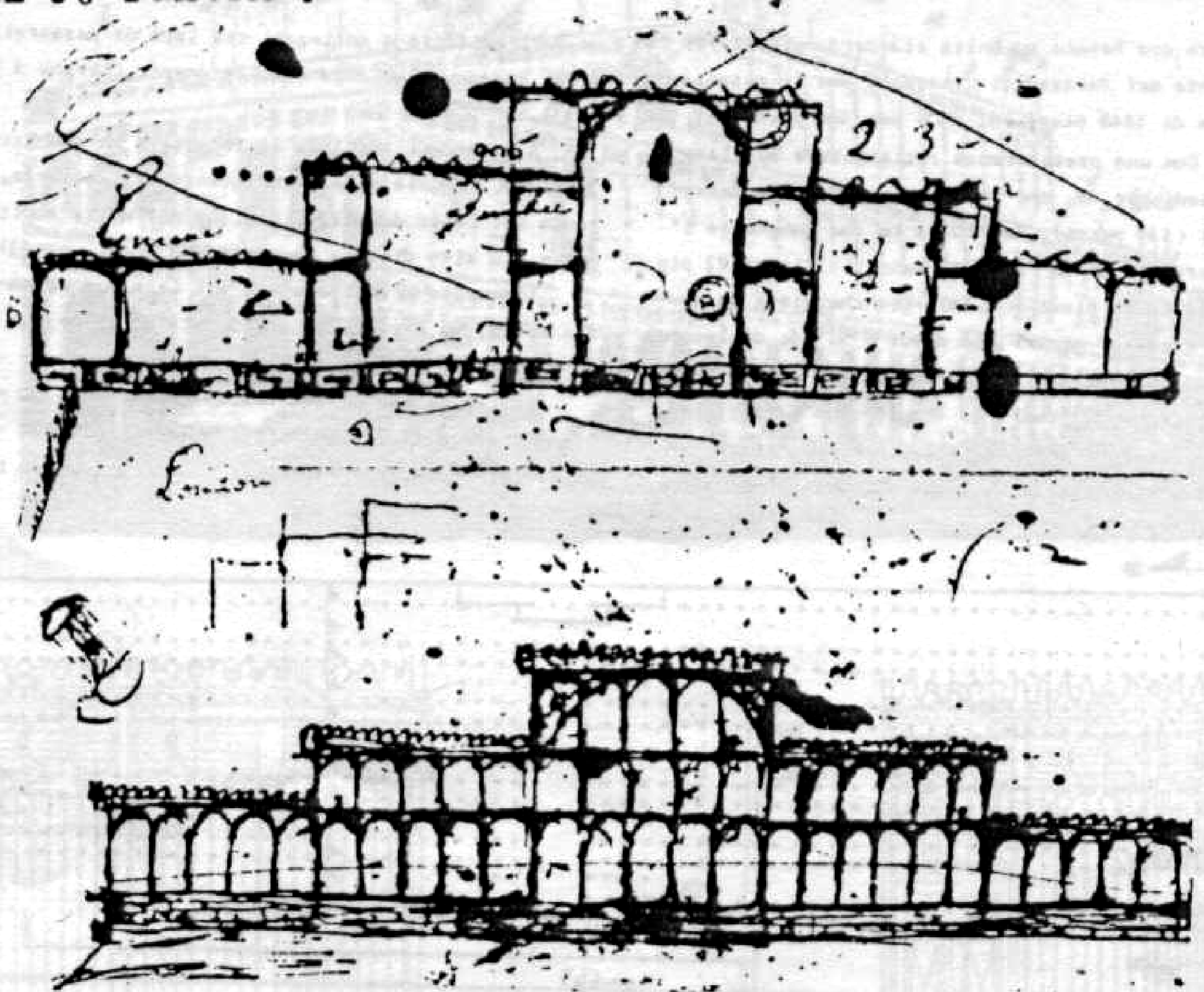


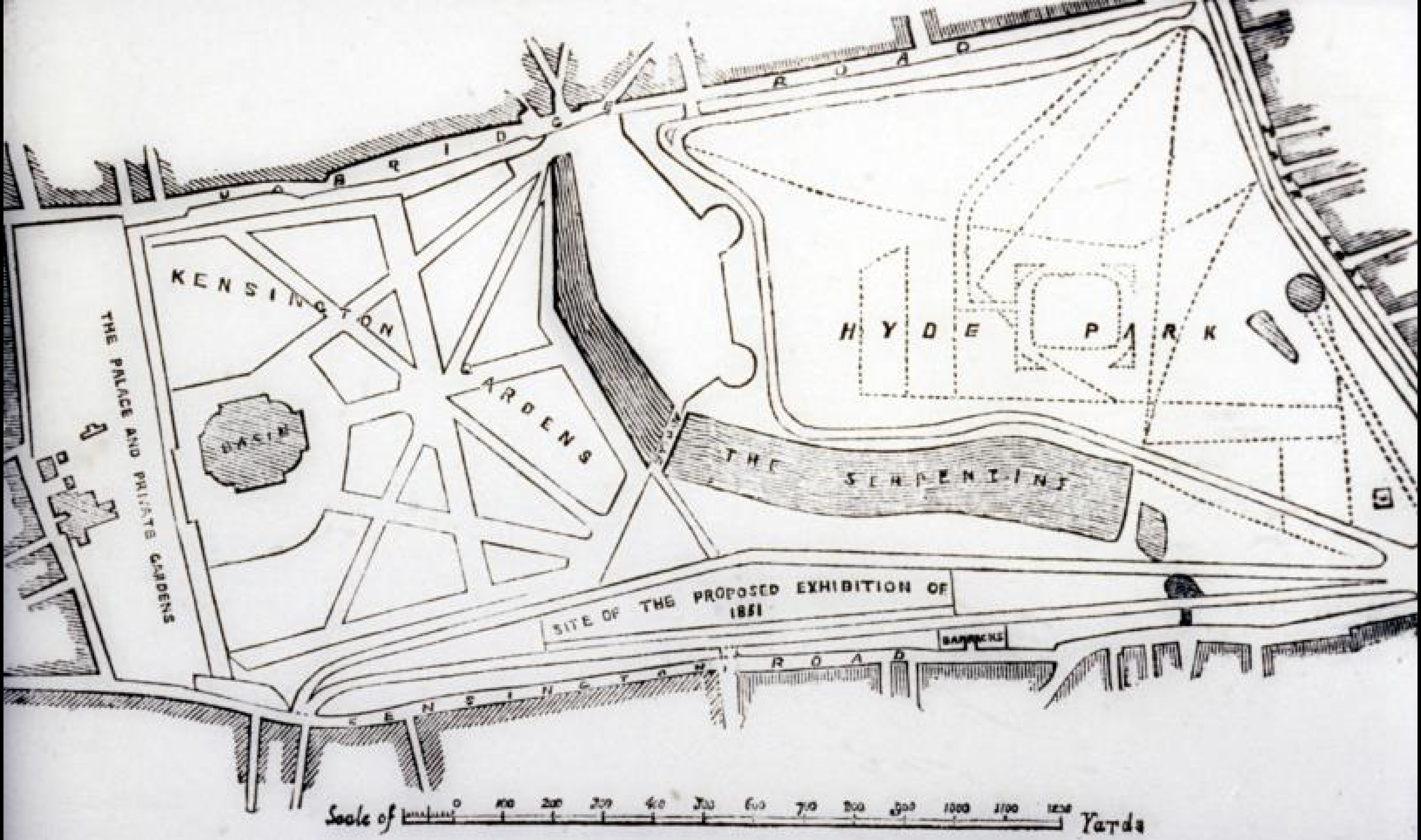
THE OFFICIAL DESIGN.



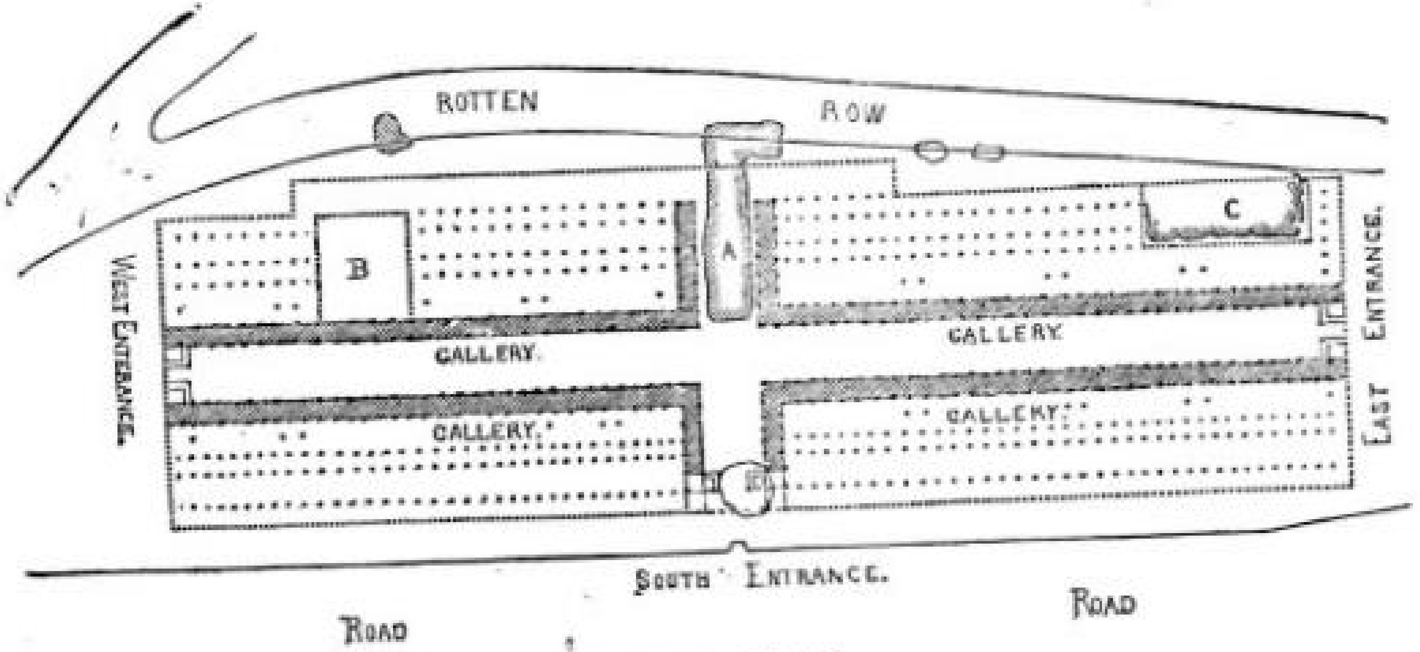
PAXTON'S DESIGN.

PROPOSALS FOR THE EXHIBITION BUILDING

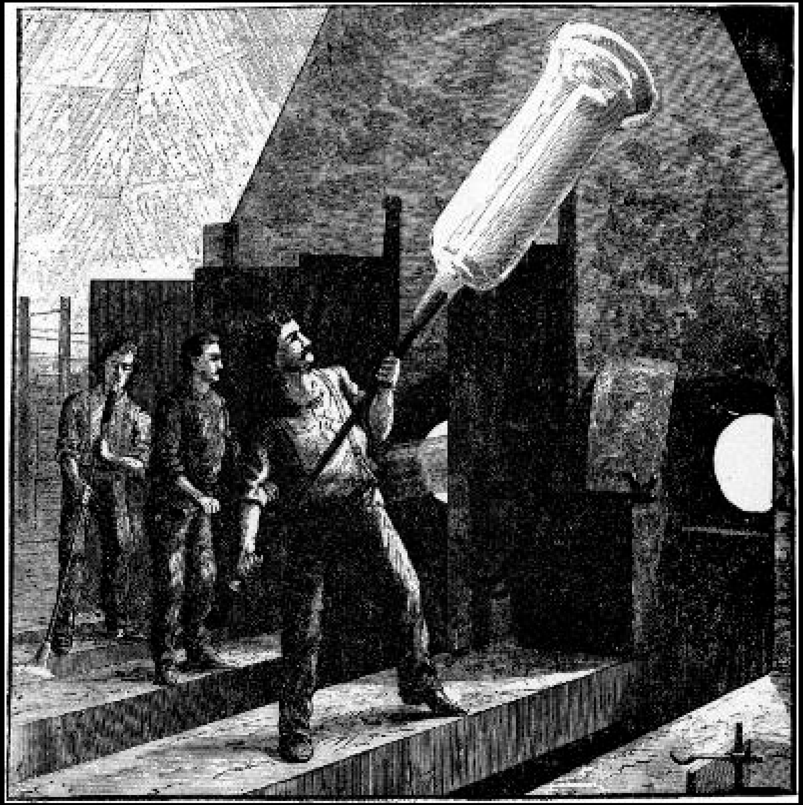




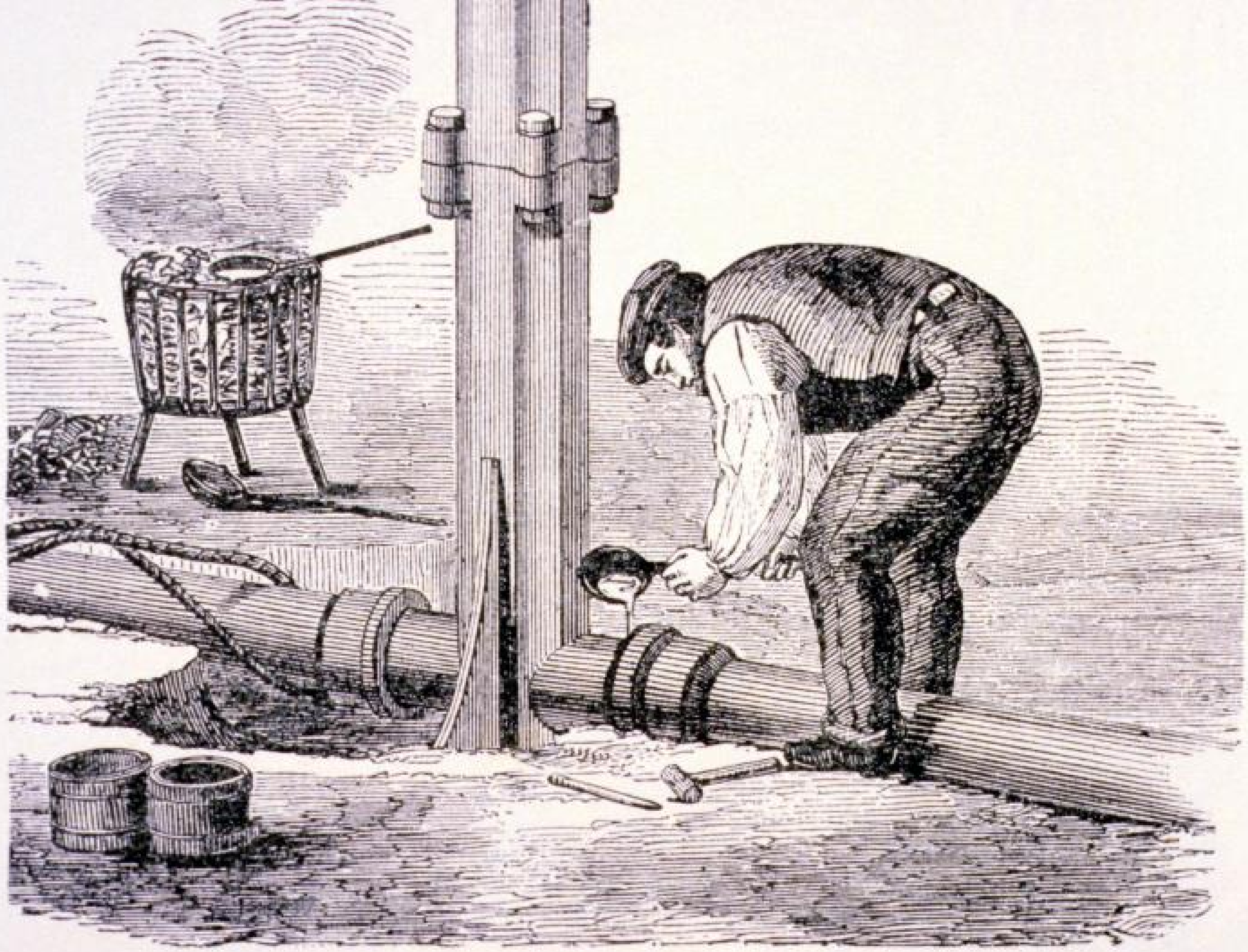
PLAN OF HYDE PARK.

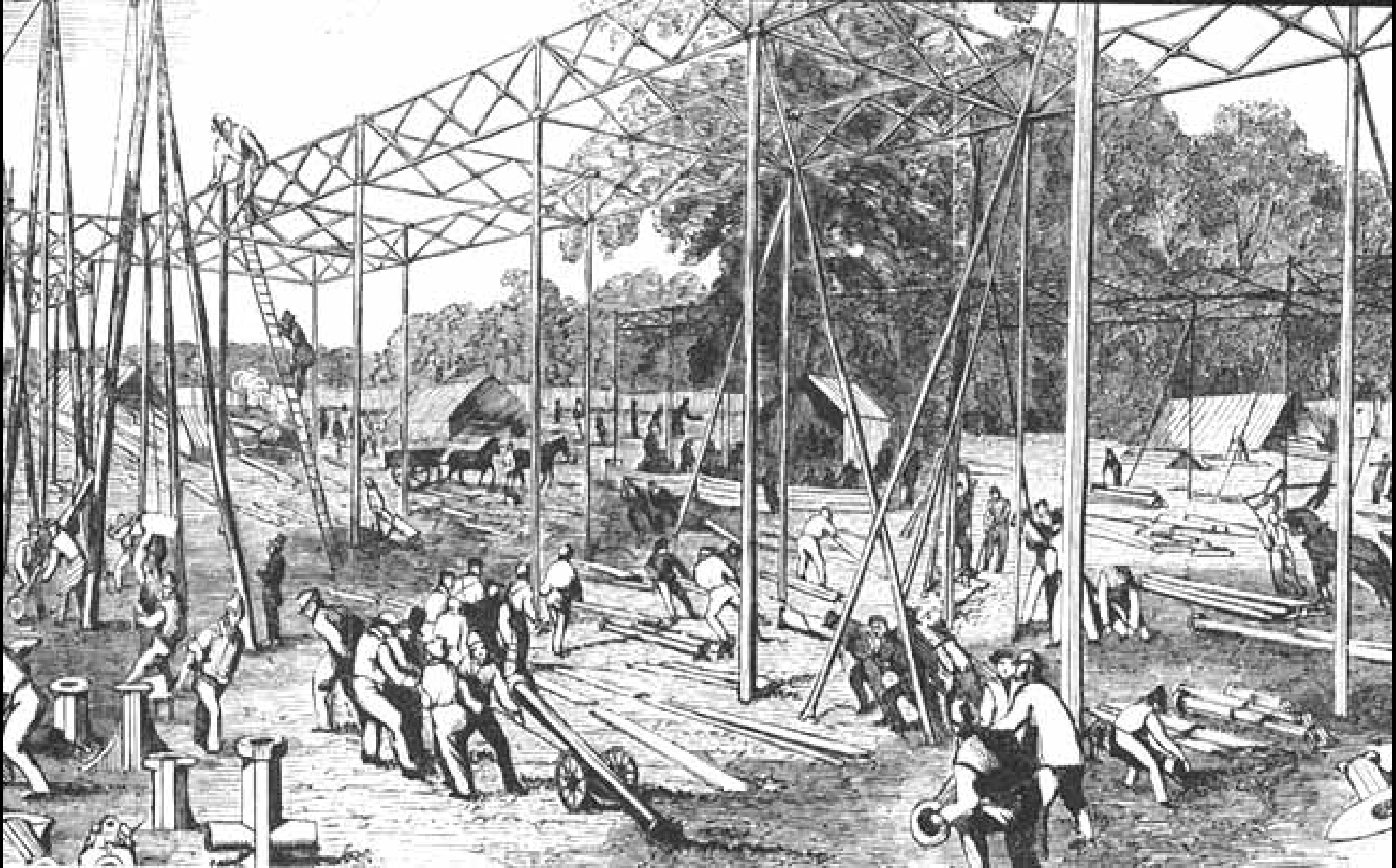

ROTTEN
ROW
A
B
C
GALLERY.
GALLERY.
GALLERY.
GALLERY.
WEST ENTRANCE.
EAST ENTRANCE.
SOUTH ENTRANCE.
ROAD
ROAD

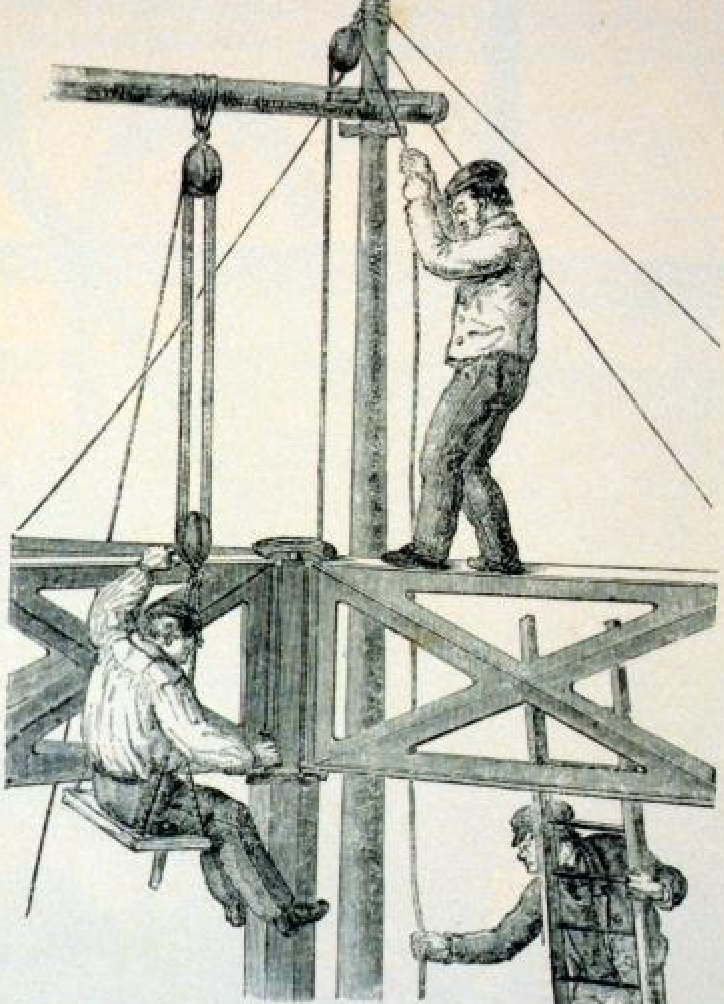
GROUND PLAN.



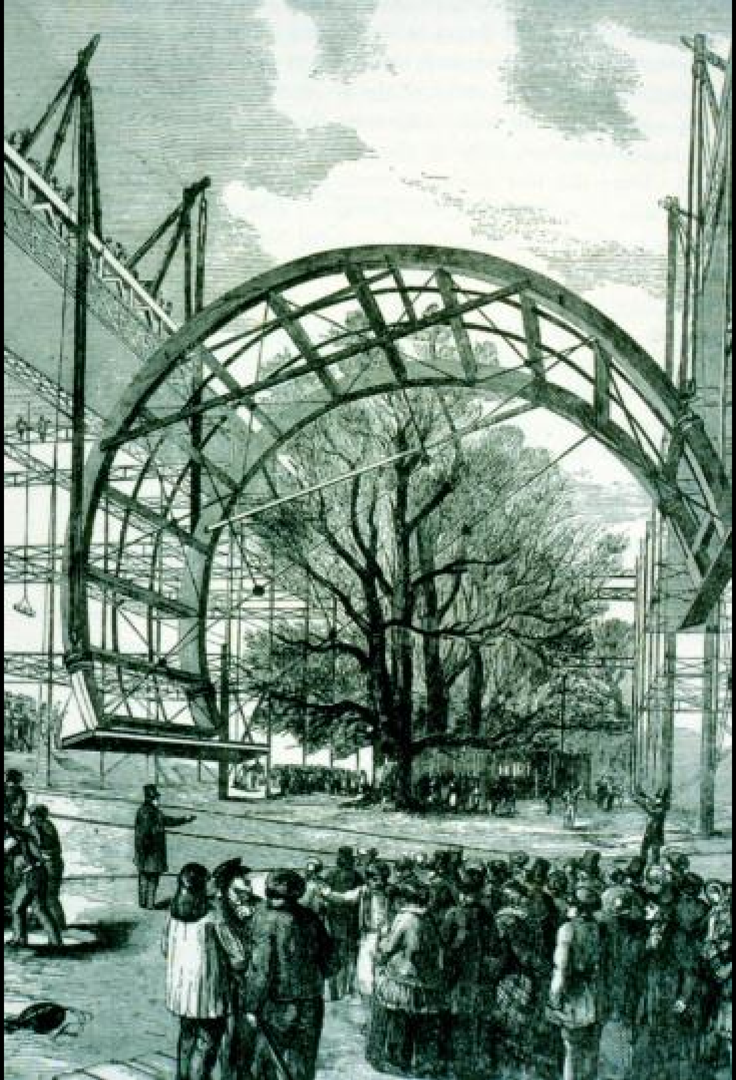
Cylinder glass is made by swinging a long hollow tube of glass in a long pit.
It folds out to 30″ x 49″.
It was cut into 3 panes of 10″ x 49″ and this formed the basis of the modules for the building – combined with the slope required so that the condensation on the roof glass would not drip, but rather cling to the glass and end up in a condensation gutter at the base of he sloped glass.

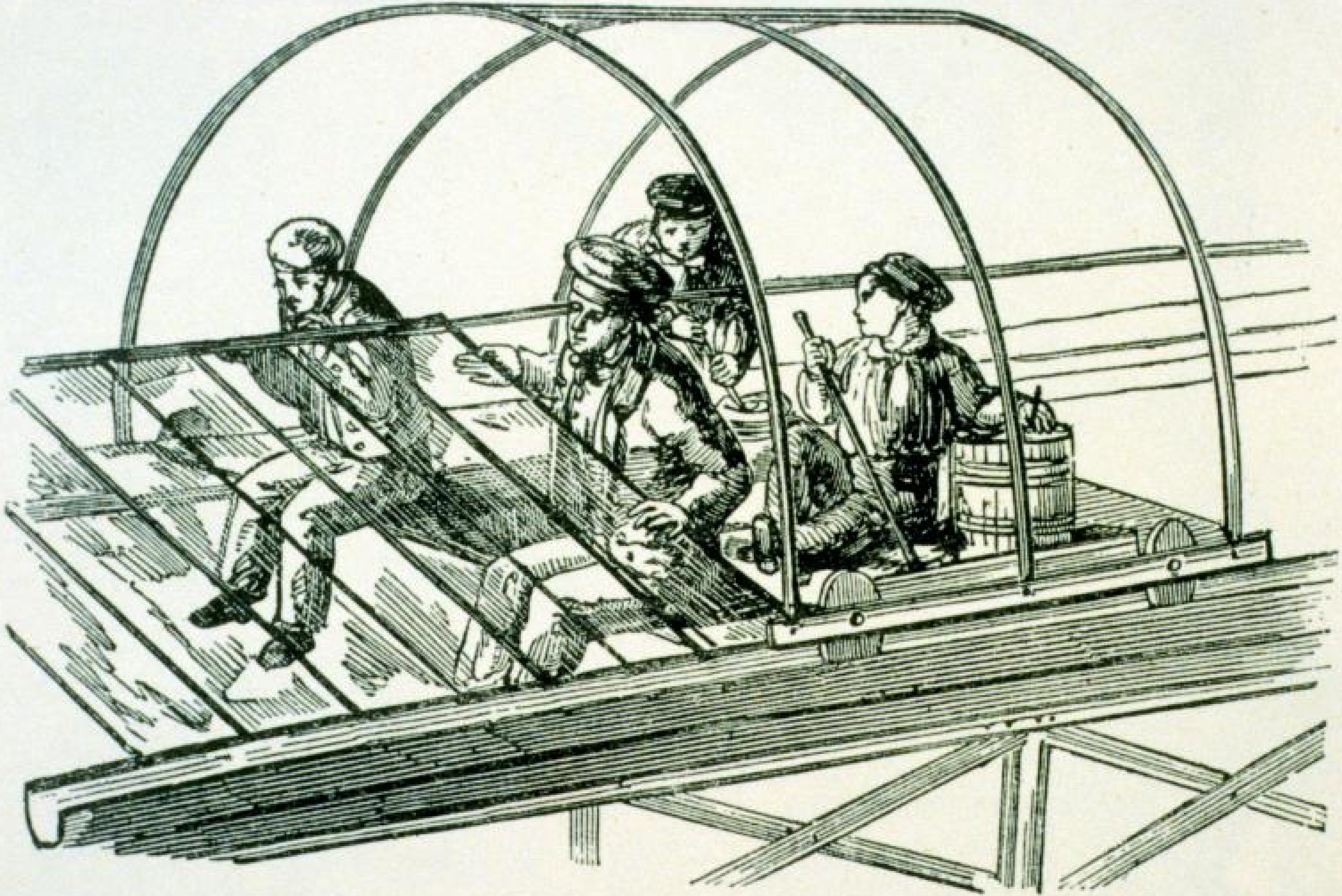




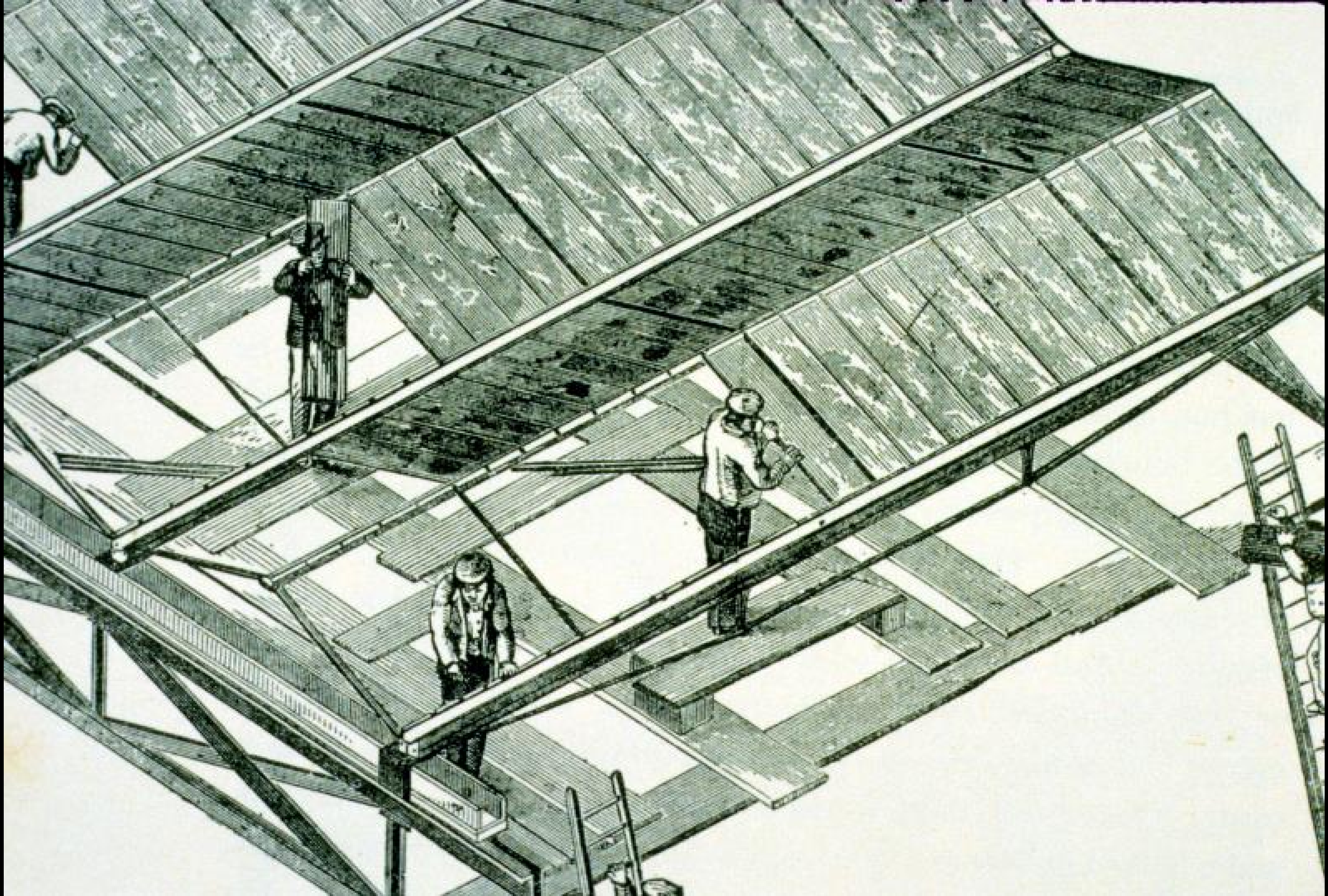


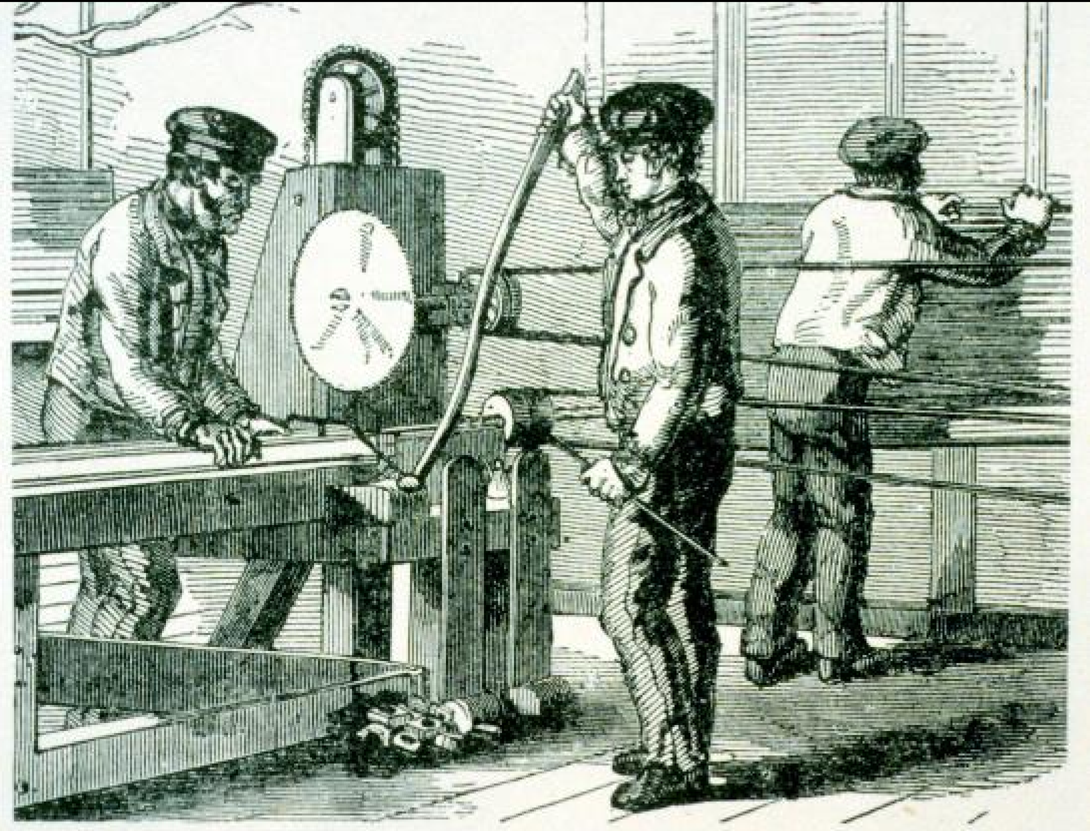
Head of a Column.



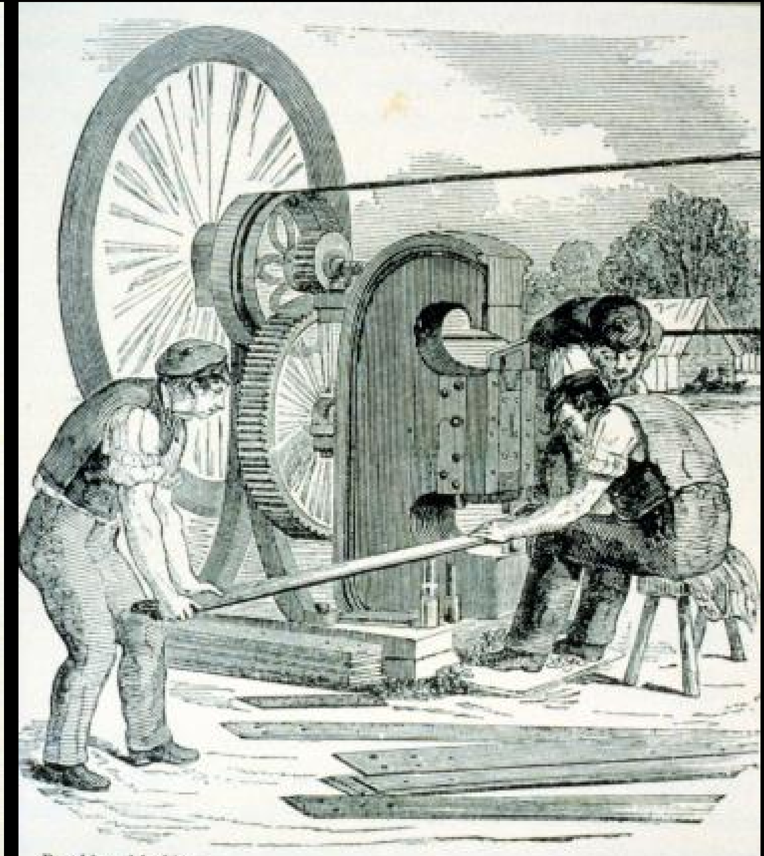


Glazing Waggon.

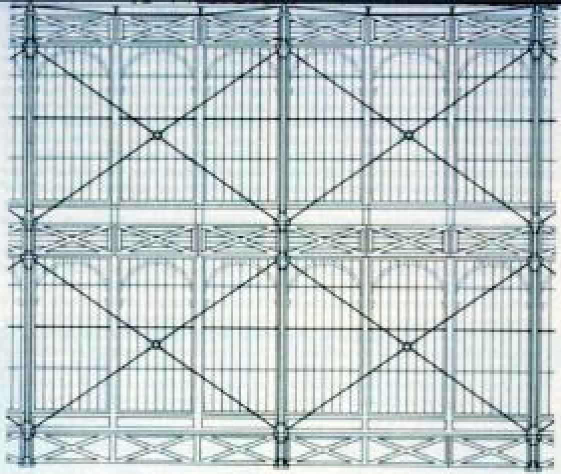




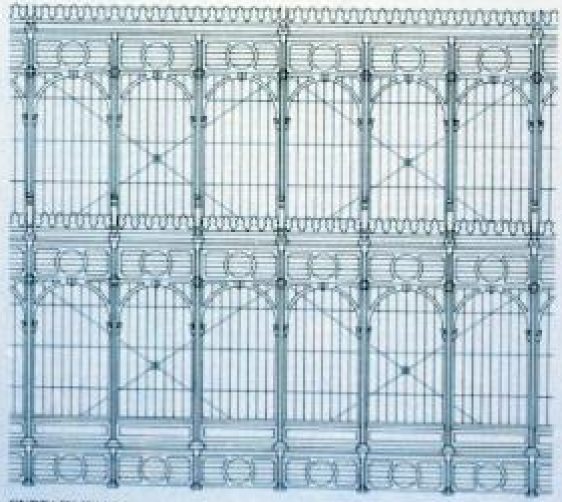
The Sash-bar Finishing Machine.



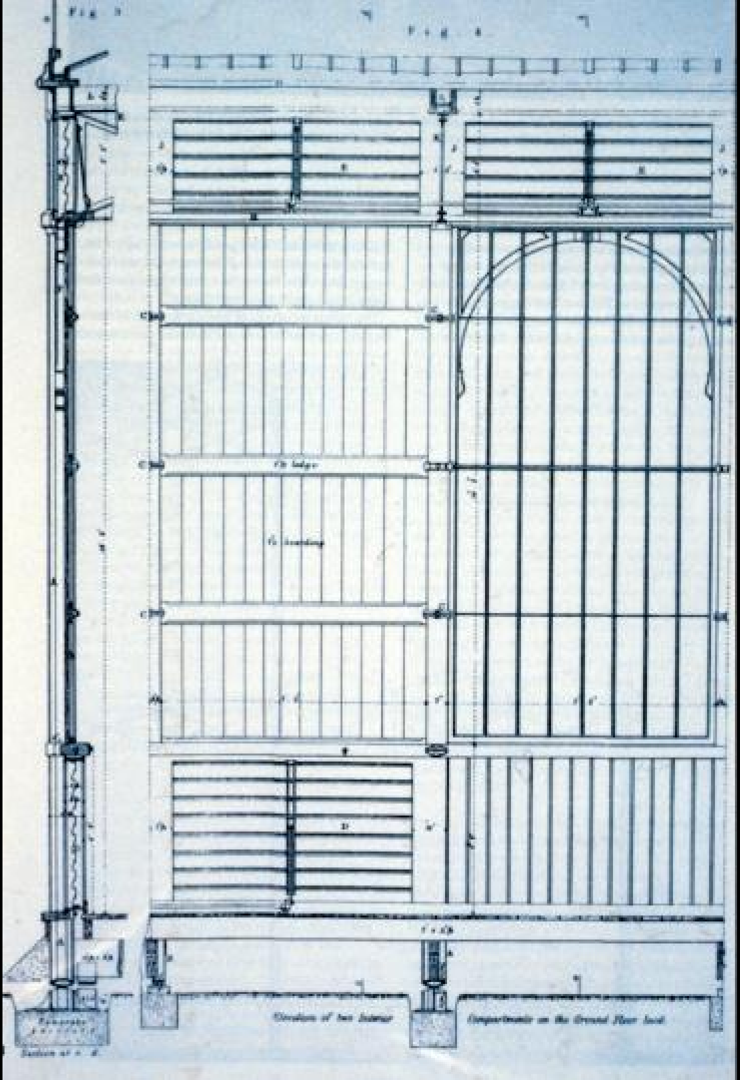
Punching Machine.

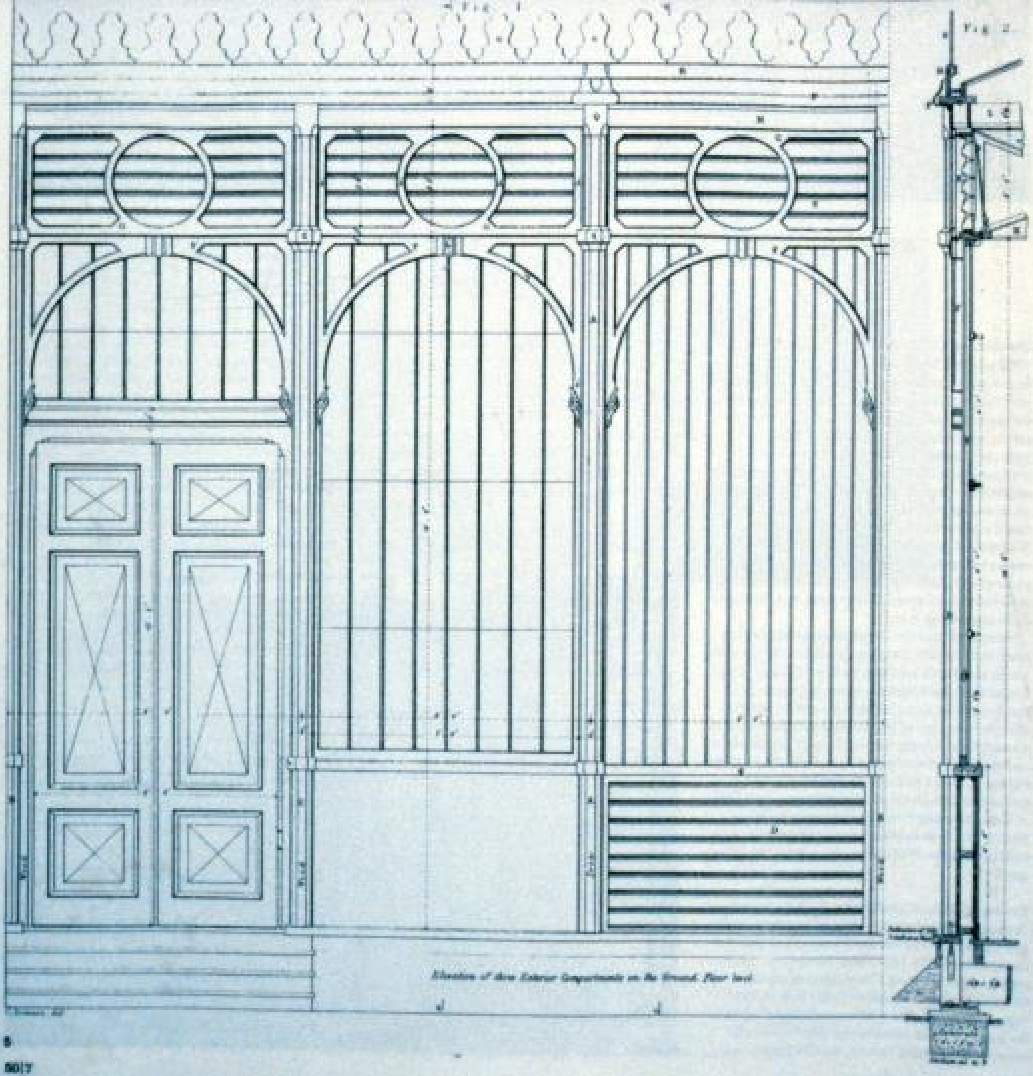


WROUGHT-IRON RODS provided a rigid support for the exterior walls of the Crystal Palace, which had no internal walls to stiffen it. Visible from inside and out (the interior view is shown here), these cross braces added to the building's strikingly contemporary appearance.

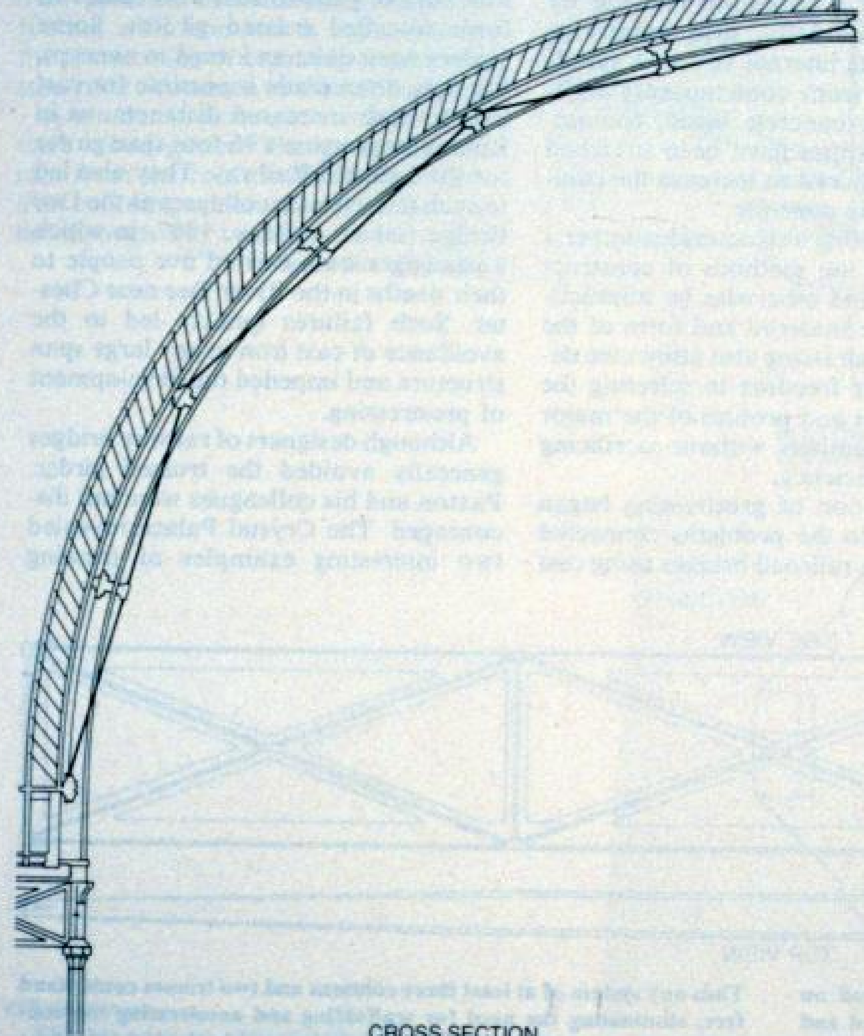


CURTAIN WALLS

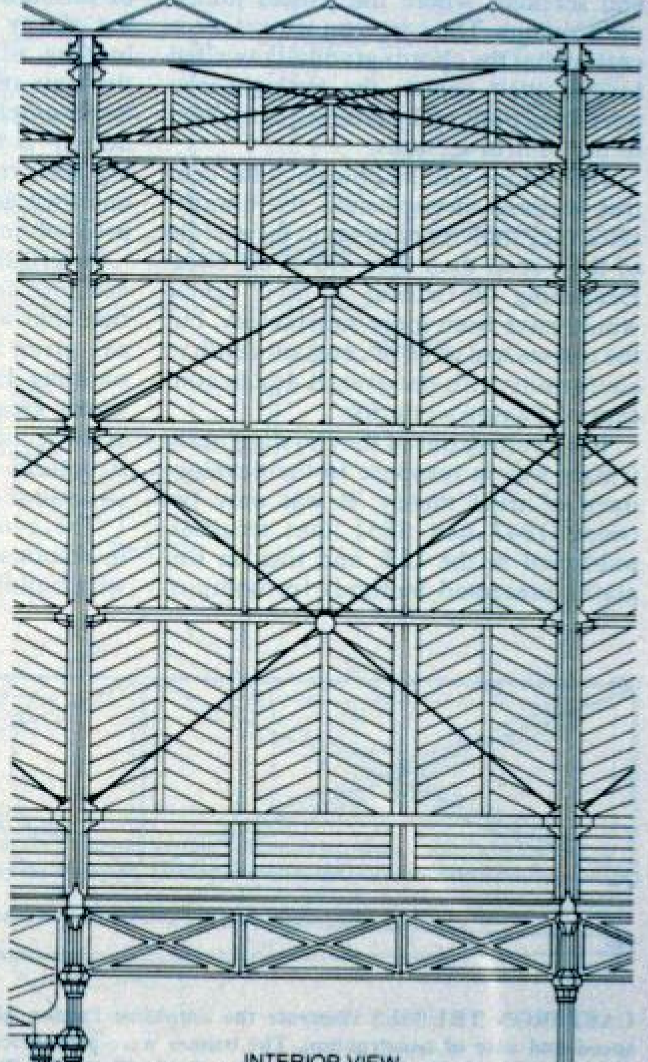



Elevation of three Exterior Compartments on the Ground-Floor level

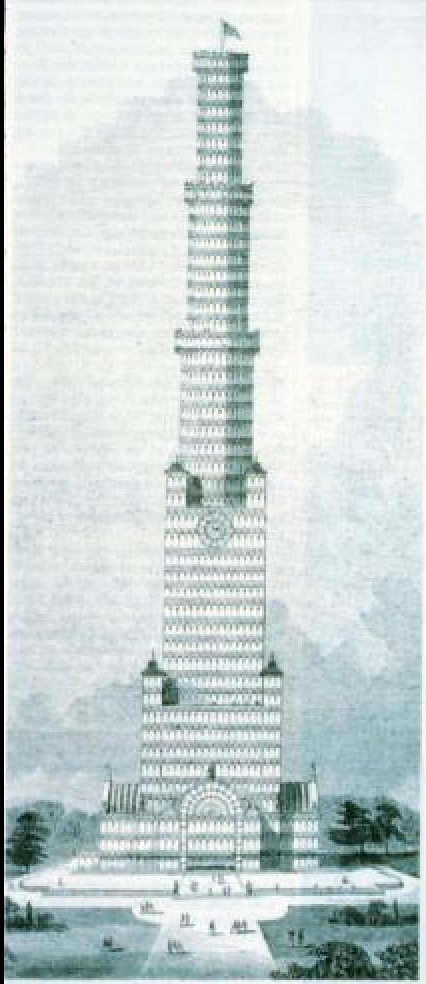
50|7



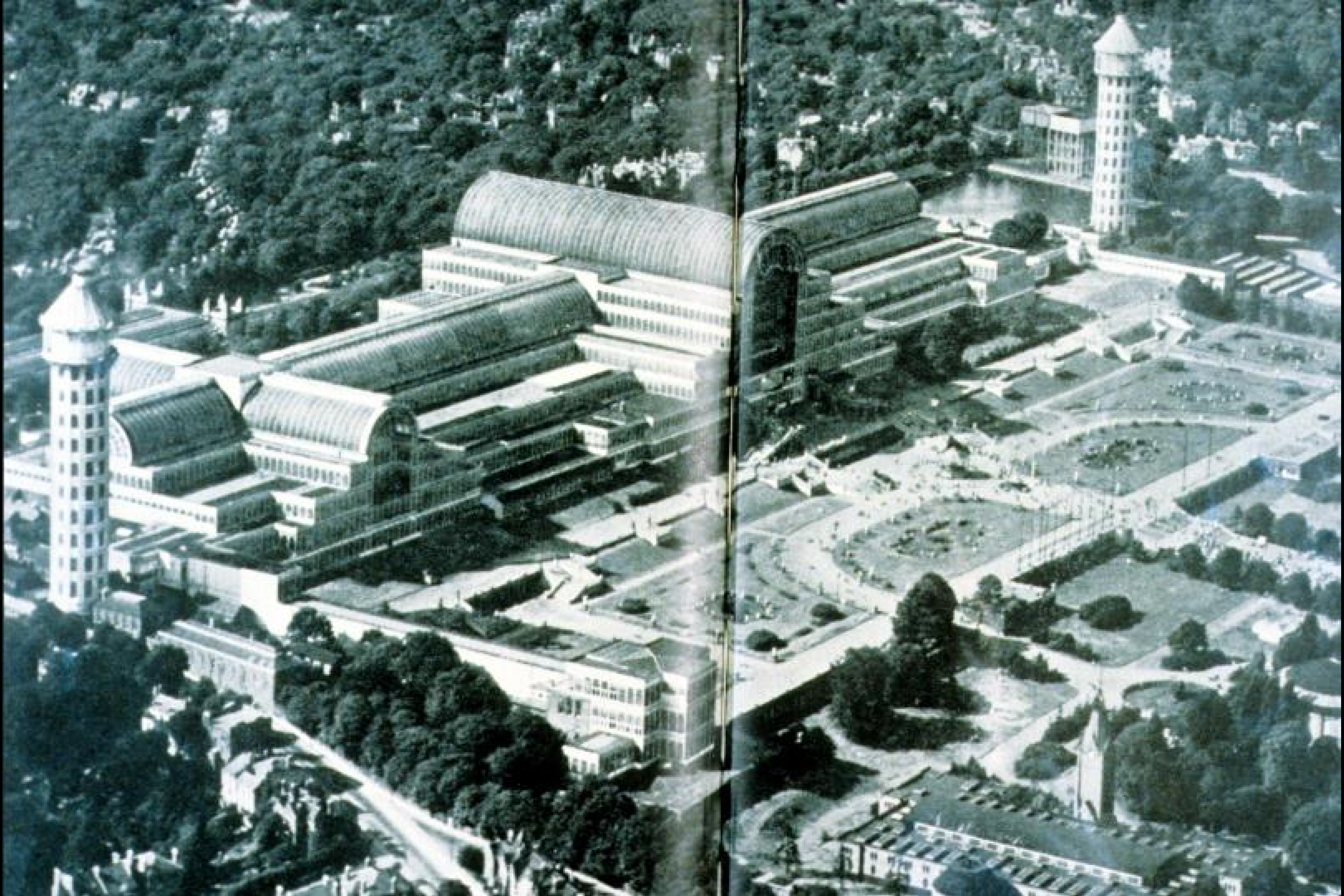
CROSS SECTION

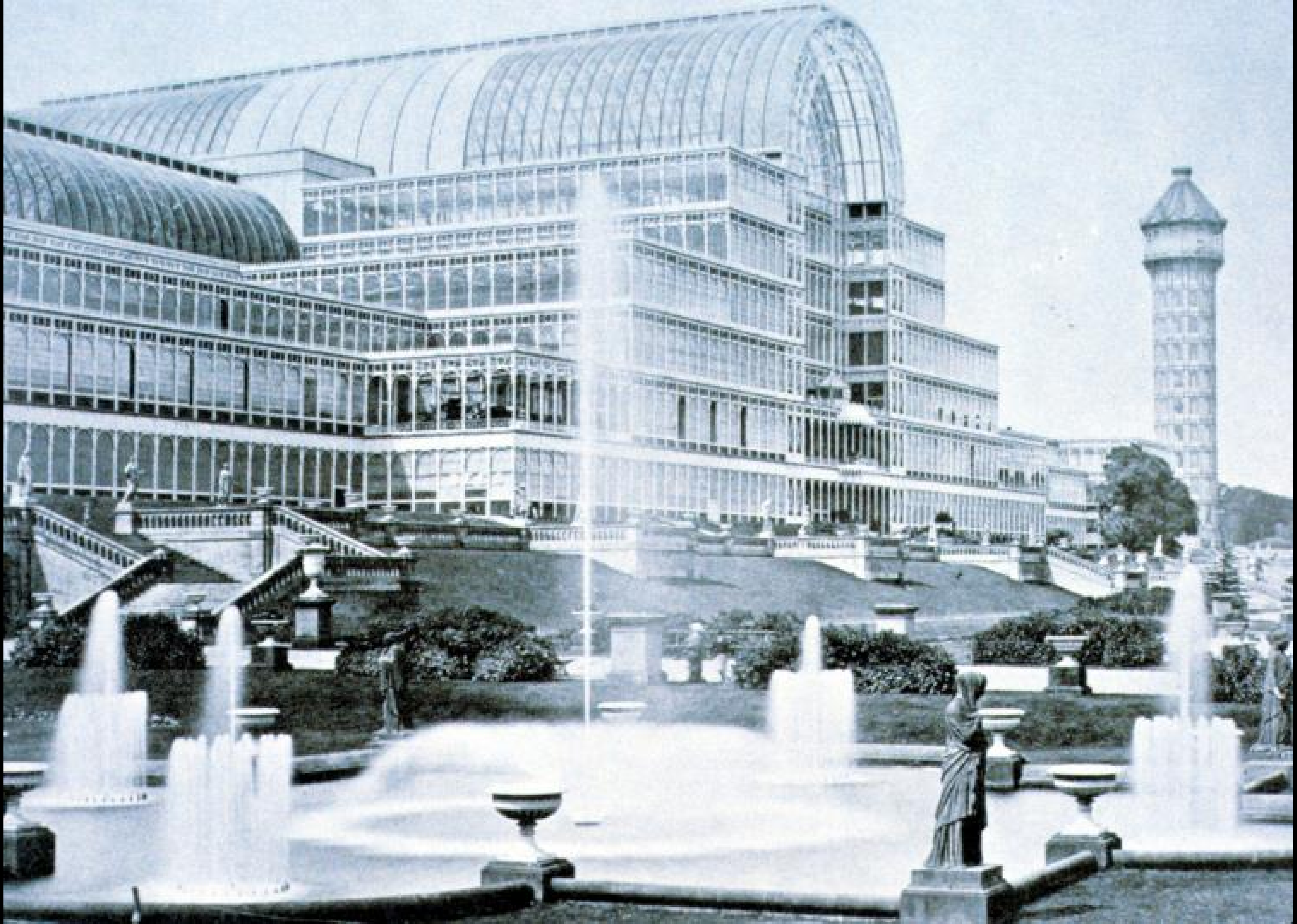


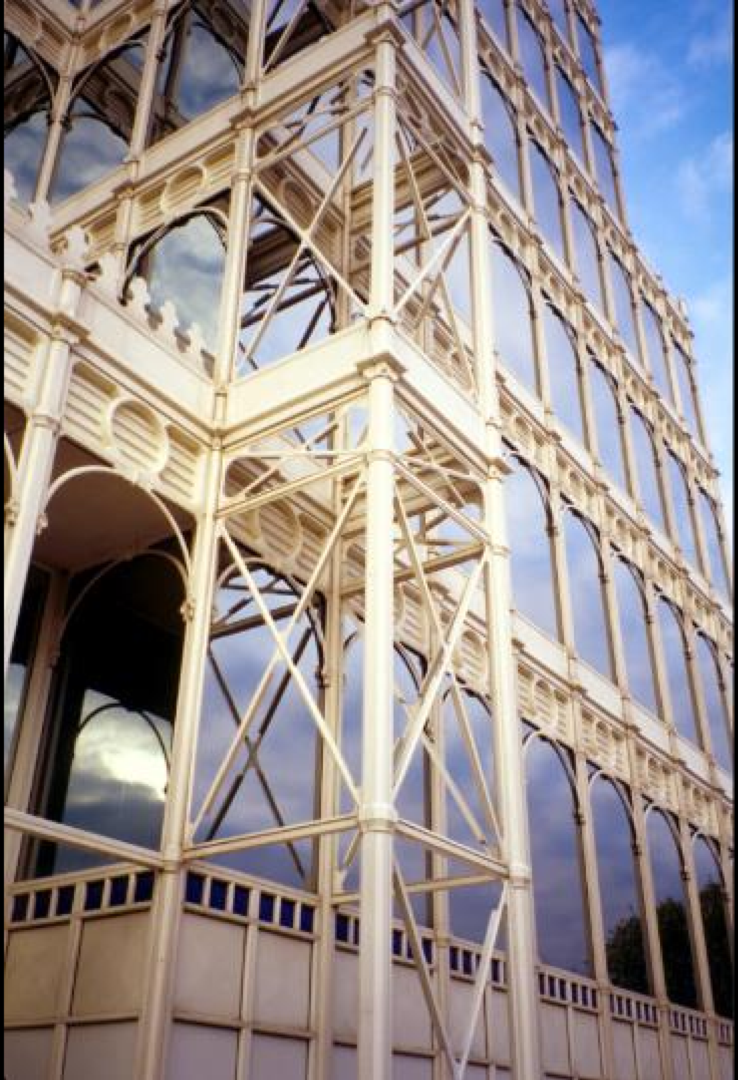
INTERIOR VIEW



MODULAR CONSTRUCTION of the Crystal Palace prompted a contemporary of Paxton's to suggest that the modular units of the building be rearranged to form a 1,000-foot tower (*left*). A vertical Crystal Palace would have been too heavy for its cast-iron columns; now steel beams make such buildings possible. At right is Skidmore, Owings & Merrill's Sears Tower, built out of stacked modular units.





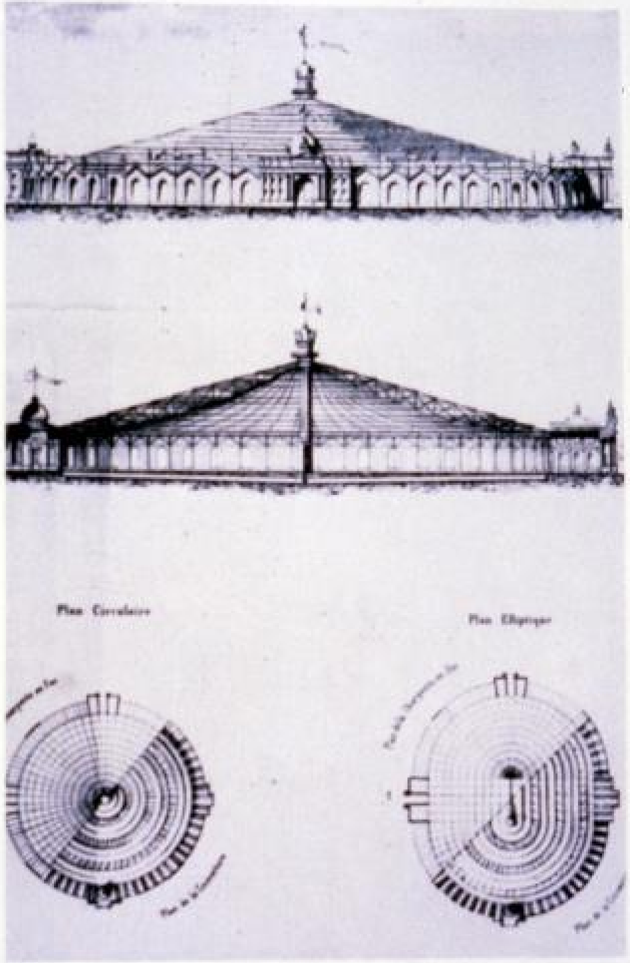
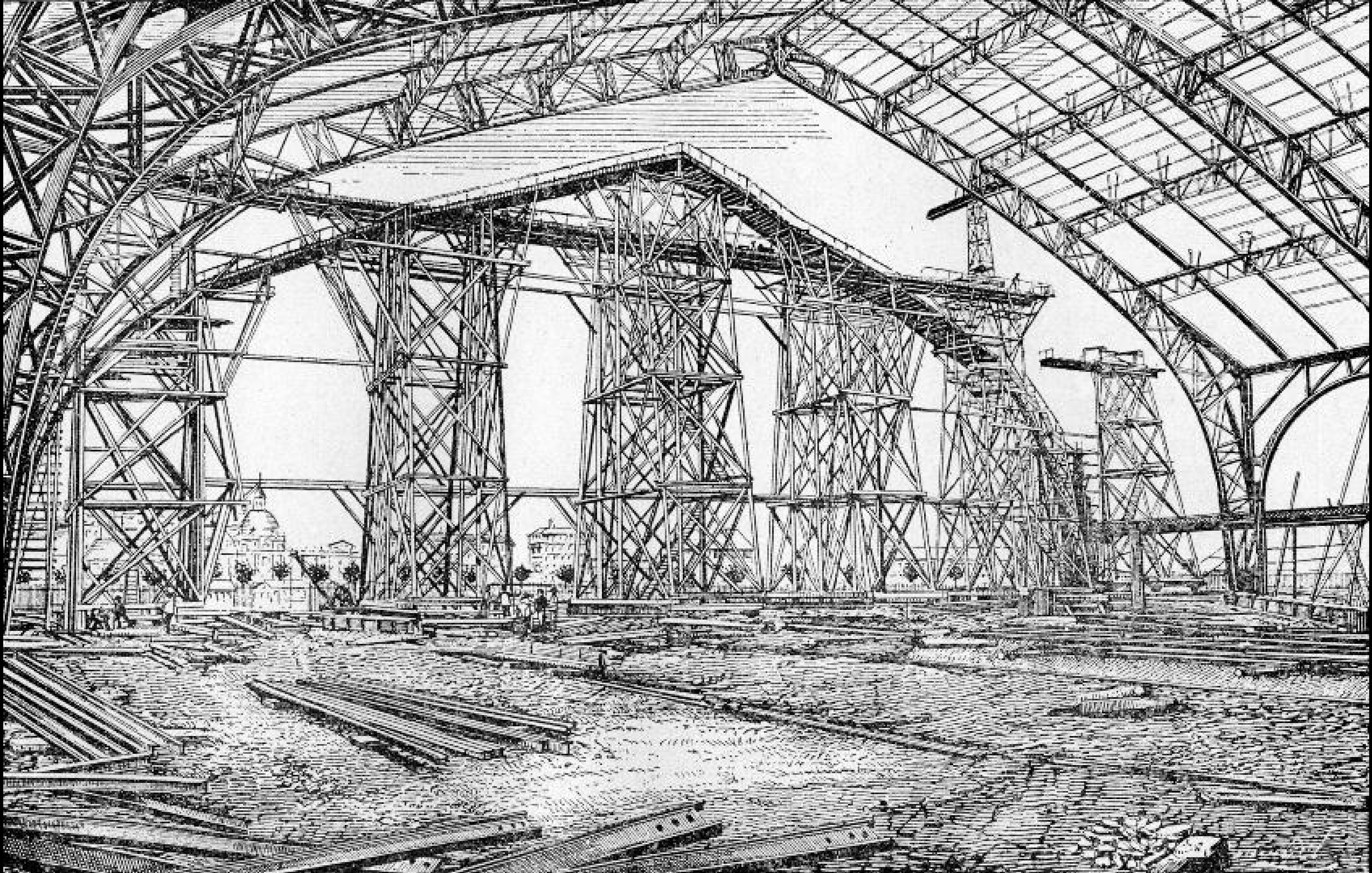
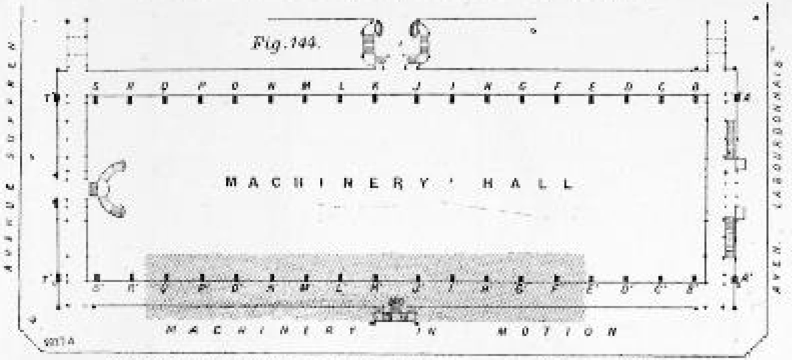


Plate 41. Paul Grieumard. Project for the International Exhibition Building of 1867, published in 1865 (Grieumard, pl. 1)

Galerie des Machines
Exposition Universale
Paris, France
Victor Contamin Engineer
1889



THE MACHINERY HALL.



FLAN SHOWING POSITION OF PIERS AND STAIRCASES. (See page 453.)

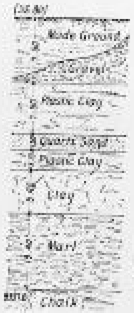
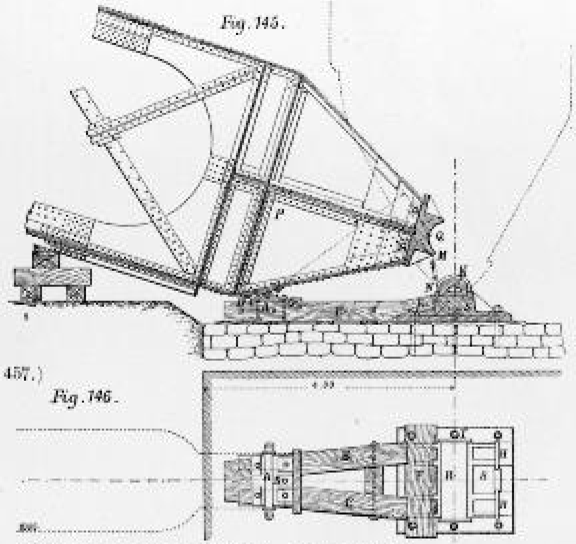


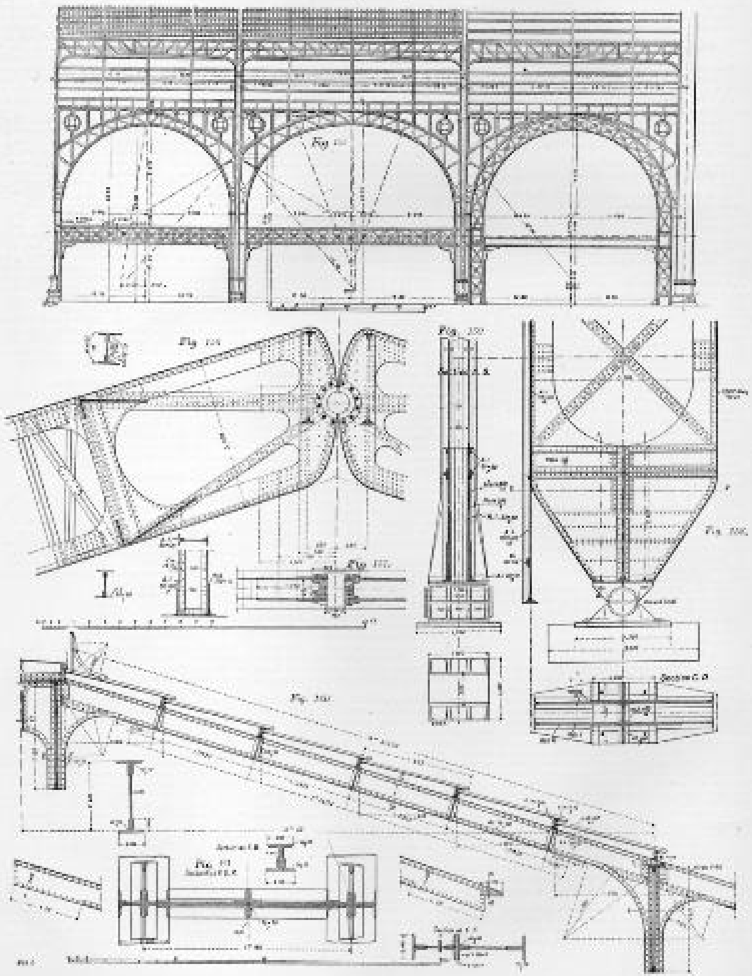
FIG. 147. (See page 457.)

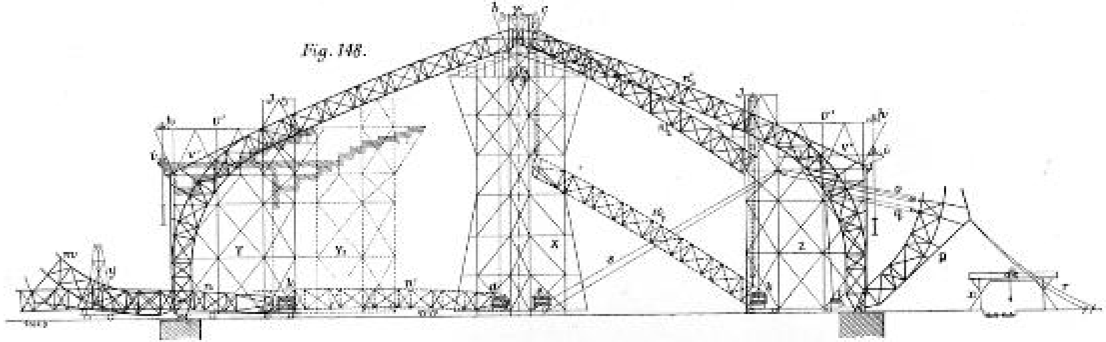


MODE OF ERECTING PRINCIPALS. (See page 458.)

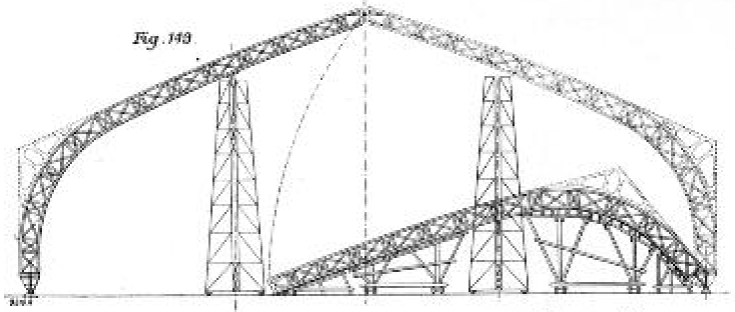
DETAILS OF ROOF OF MACHINERY HALL AND OF SIDE GALLERIES.

(For Description, see page [illegible].)

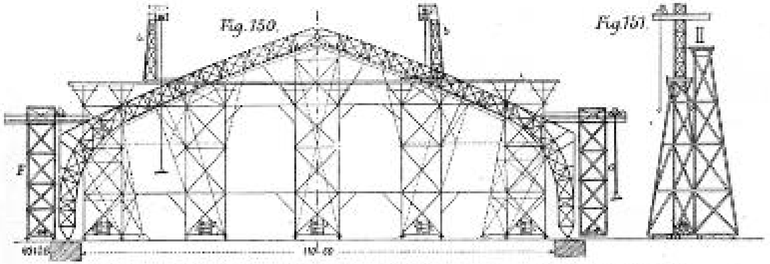




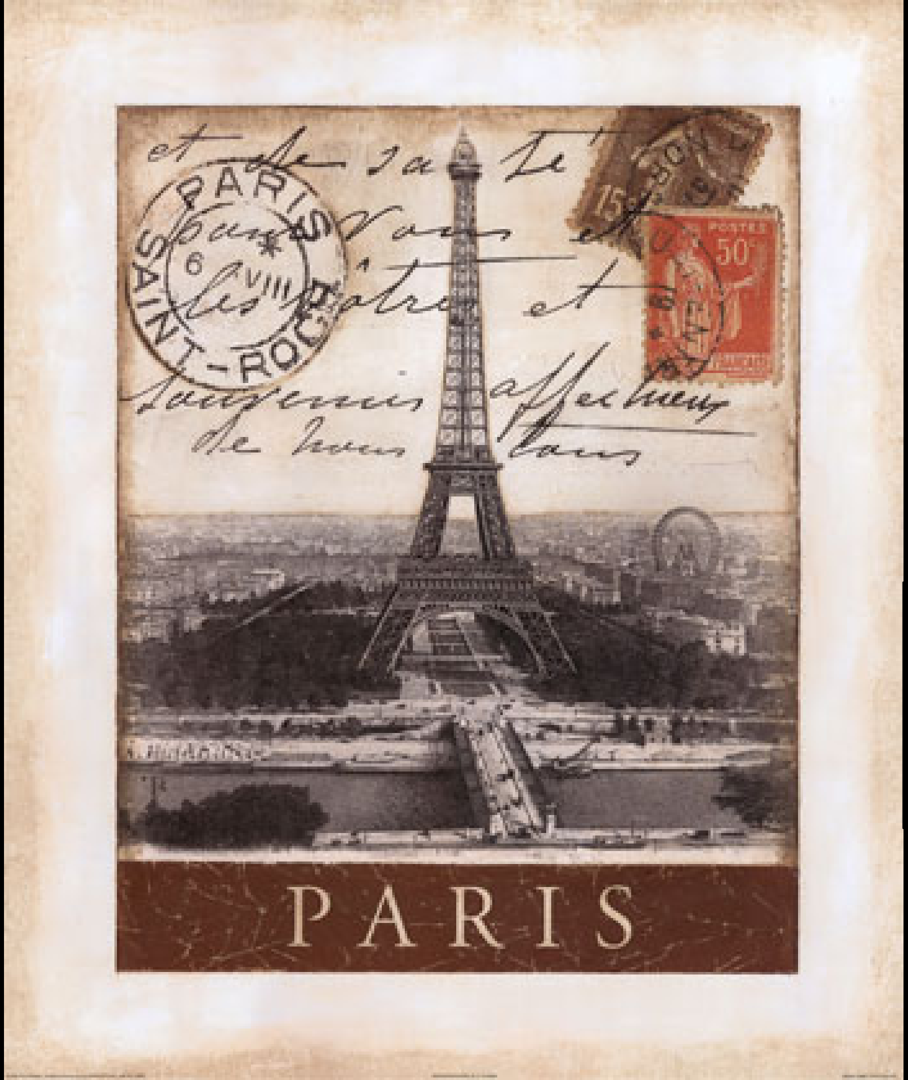
MODE OF ERECTING MACHINERY HALL ROOF; THE FIVES LILLE COMPANY. (See page 457.)



PROPOSED MODE OF ERECTING MACHINERY HALL ROOF. (See page 457.)



MODE OF ERECTING MACHINERY HALL ROOF; MM. CAIL ET CIE. (See page 458.)



Eiffel Tower
Great Exposition 1889
Paris, France
Gustav Eiffel
324m

mai 1888

juillet 1888

septembre 1888

mai 1889

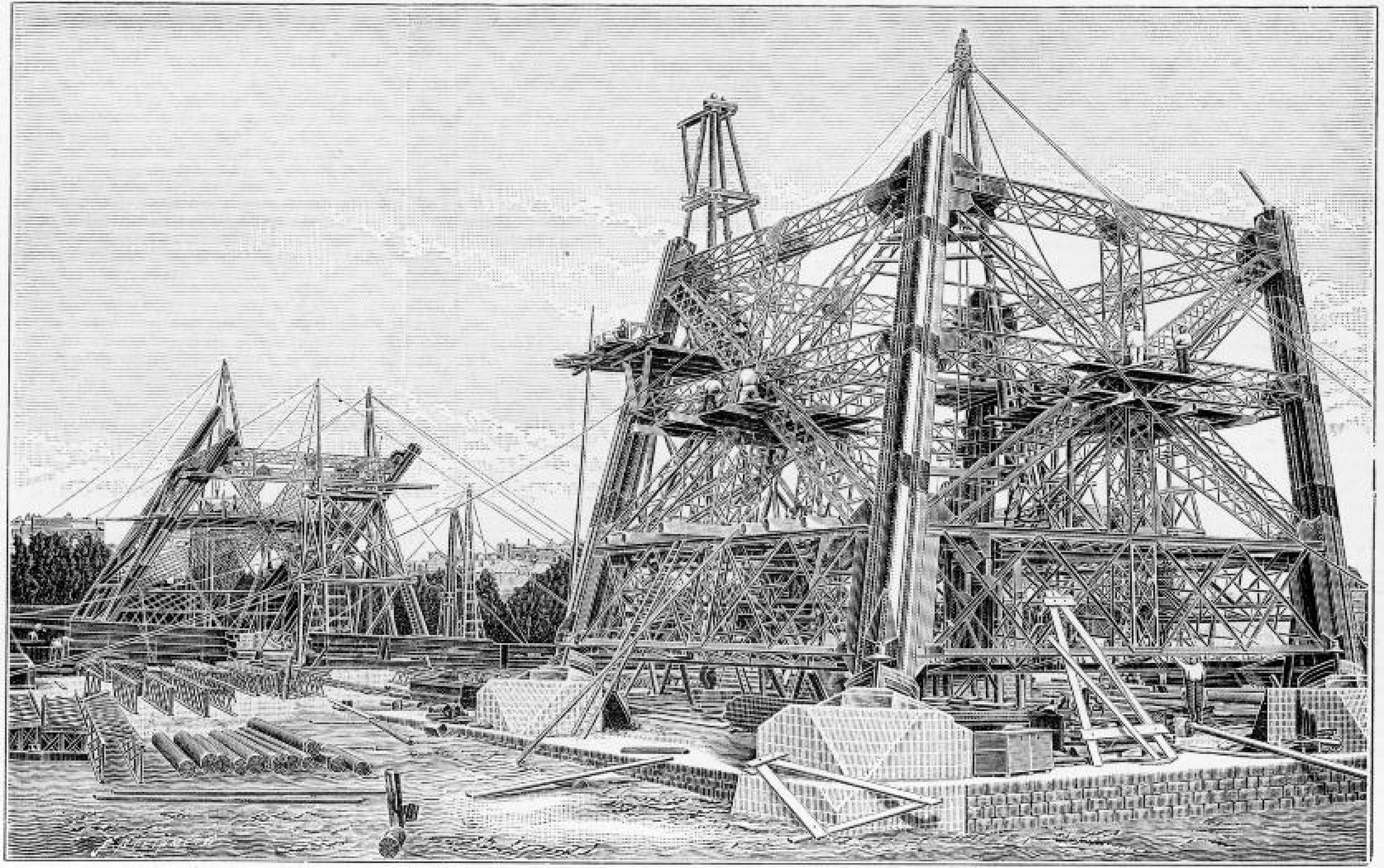
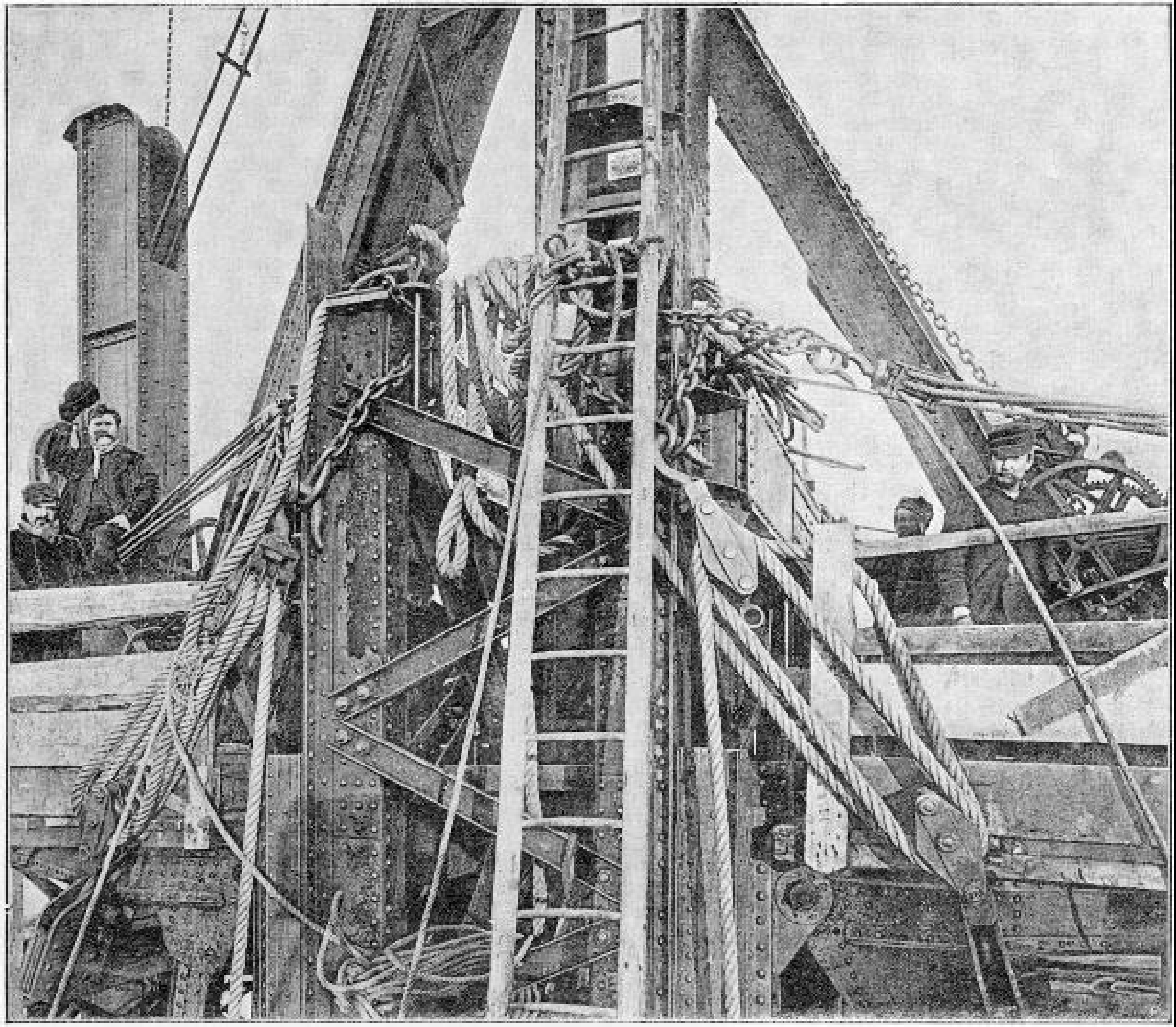
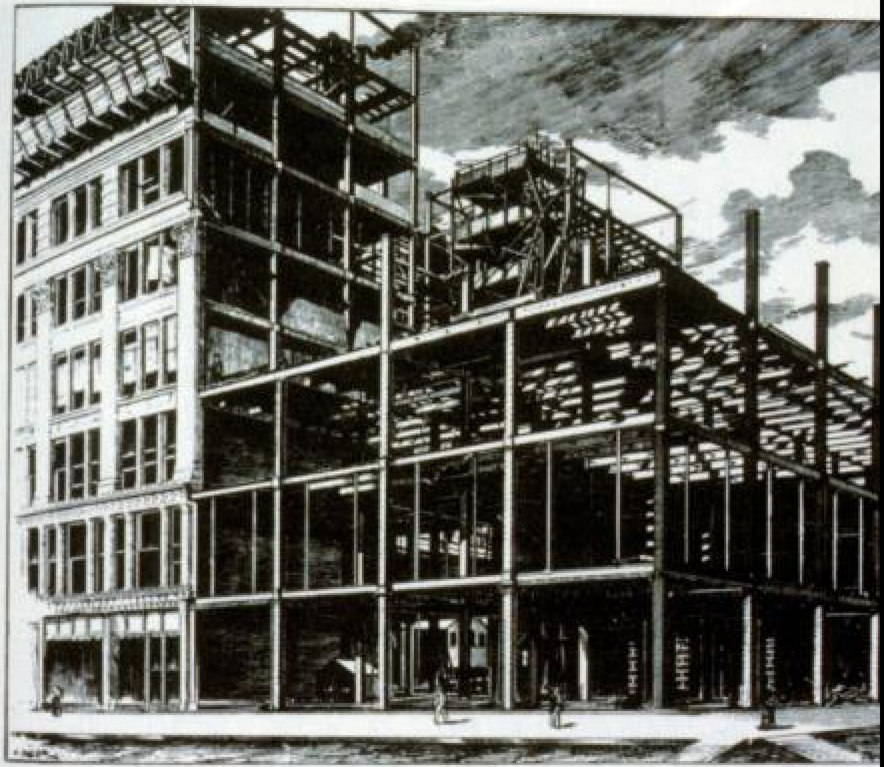
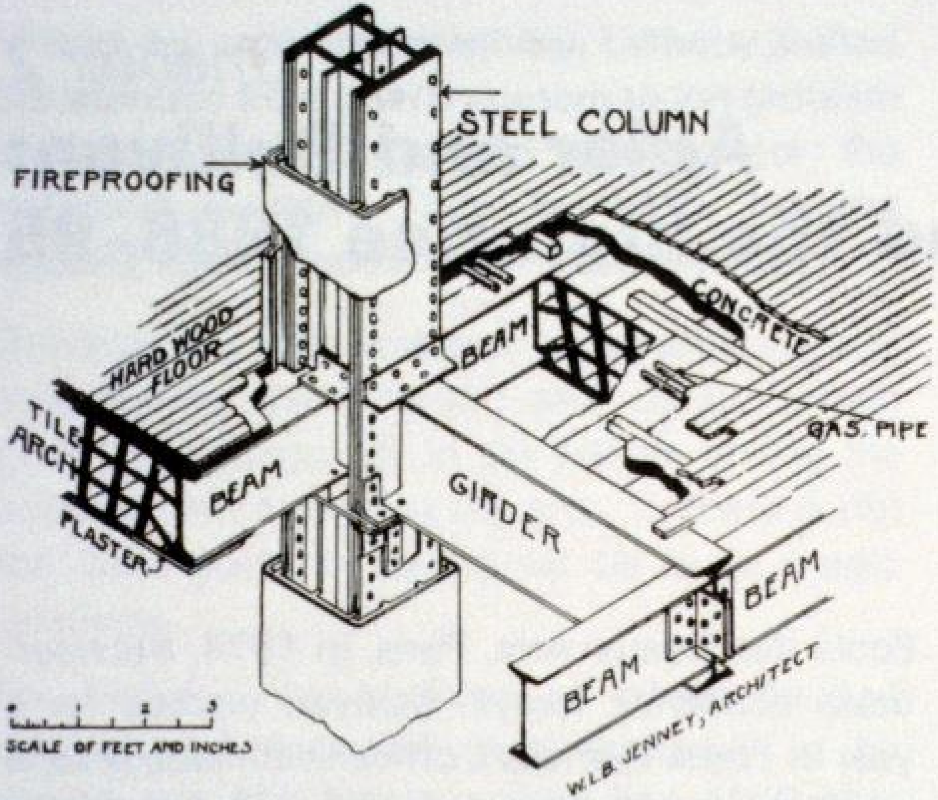


FIG. 37. THE EIFFEL TOWER, COLUMN NO. 4; SEPTEMBER, 1887.



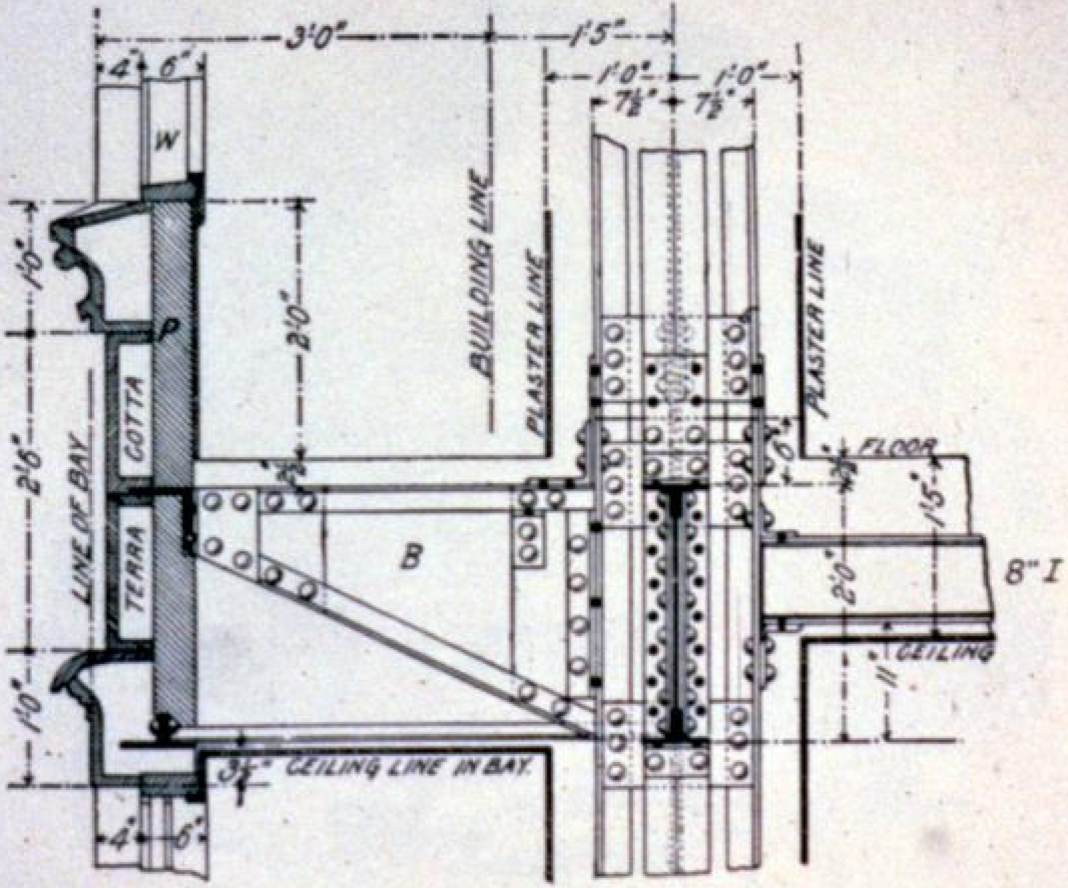
44. Fair (Montgomery Ward) Store, Chicago, Ill., 1890-91. William Le Baron Jenney, architect. Part of the steel and wrought-iron frame during construction.



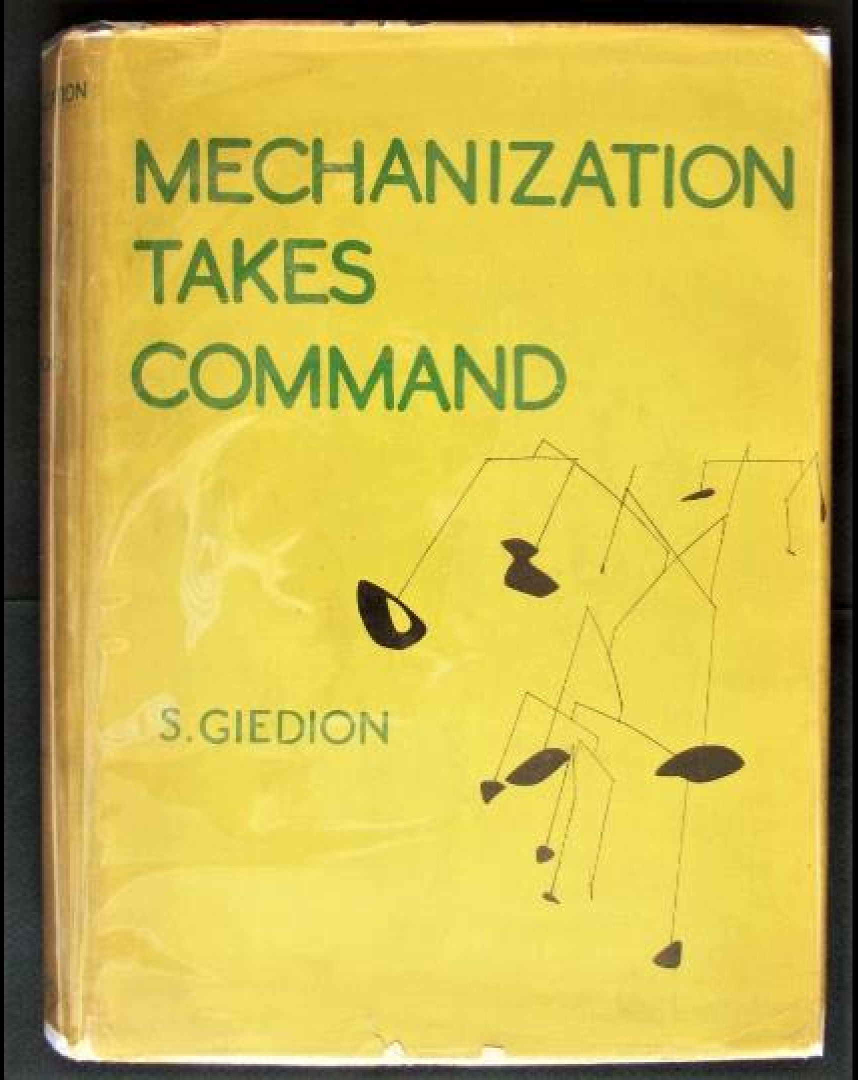


32 Jenney, Fair Store, Chicago, 1890–91. Detail of fireproof steel-frame construction.

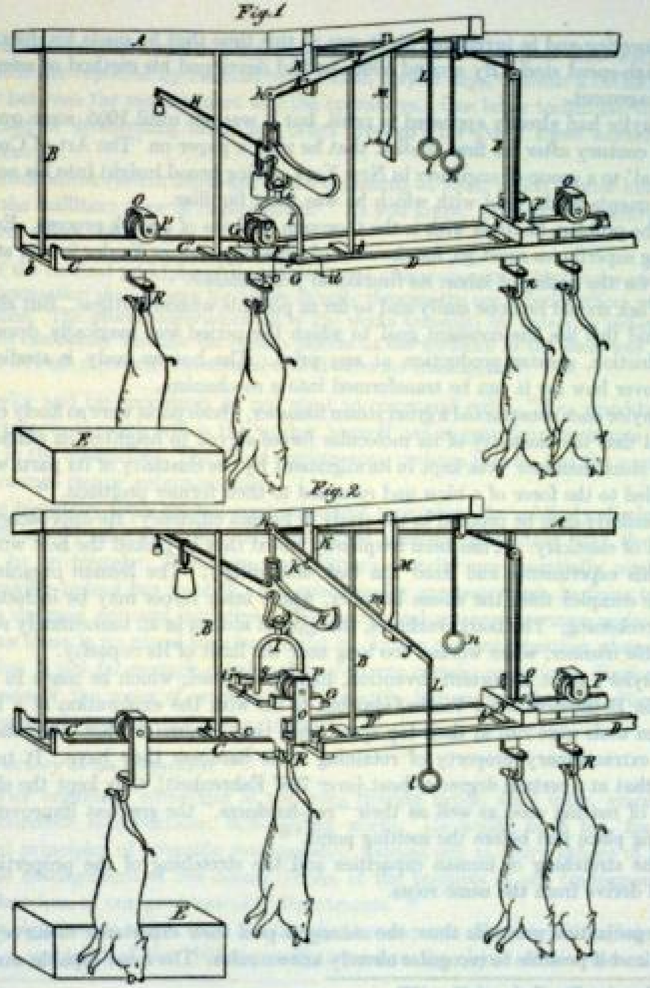
Reliance Building
Chicago, Illinois
Burnham, Root & Atwood
1895
First real curtainwall skyscraper



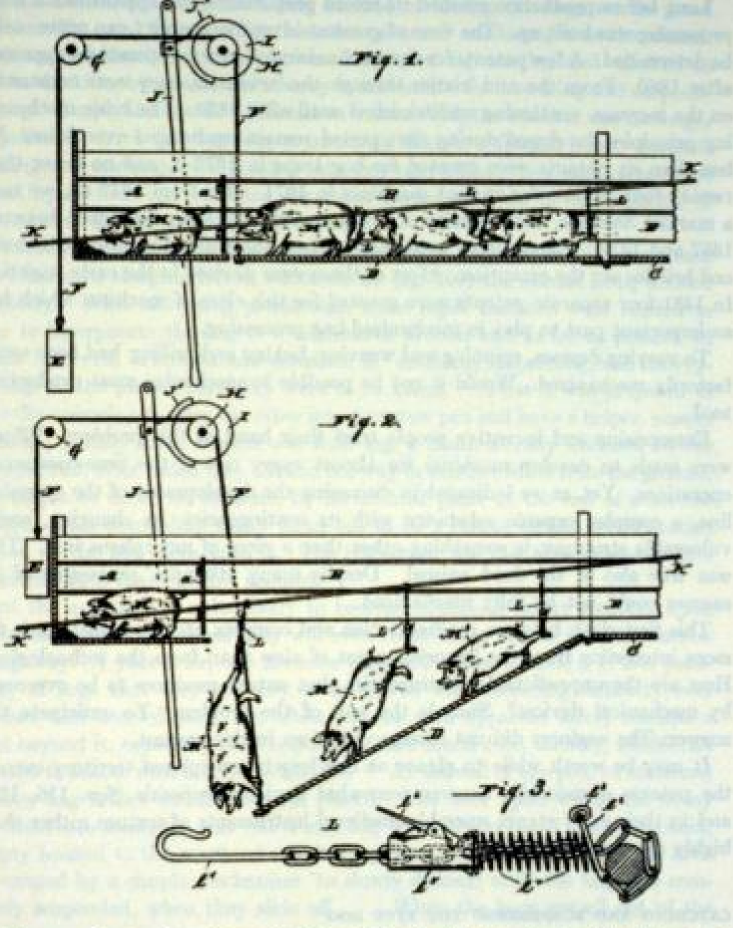
27 Atwood and Burnham, Reliance Building, Chicago, 1890/94-95. Cross section of window bay.



The Effects of
Industrialization



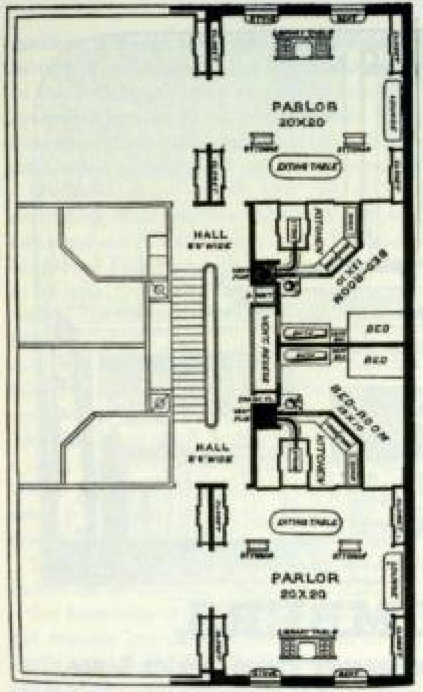
50. Automatic Hog-Weighing Apparatus for Use in Packing Houses. Cincinnati, 1869. *This device invented by a Cincinnatian shows that the late 1860's had considerable practice in combining the overhead railway with sections of the assembly line.* (*U. S. Patent 92,083, 29 June 1869*)



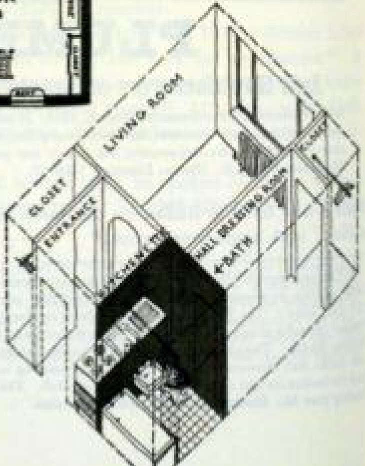
117. Apparatus for Catching and Suspending Hogs. 1882. *Here the living animal must be introduced into the 'disassembly' line. From the 1870's on when stunning was found too slow, devices were proposed to hoist the hog to the overhead rail without struggle: 'The hog M acts as a decoy for the others, and much time and labor are thus saved. The brake is manipulated to allow the trap D to slowly descend until the hogs are completely suspended, when they slide off on the bar K to the place where they are to be killed.'* (*U. S. Patent 252,112, 10 January 1882*)

Residential Initiatives

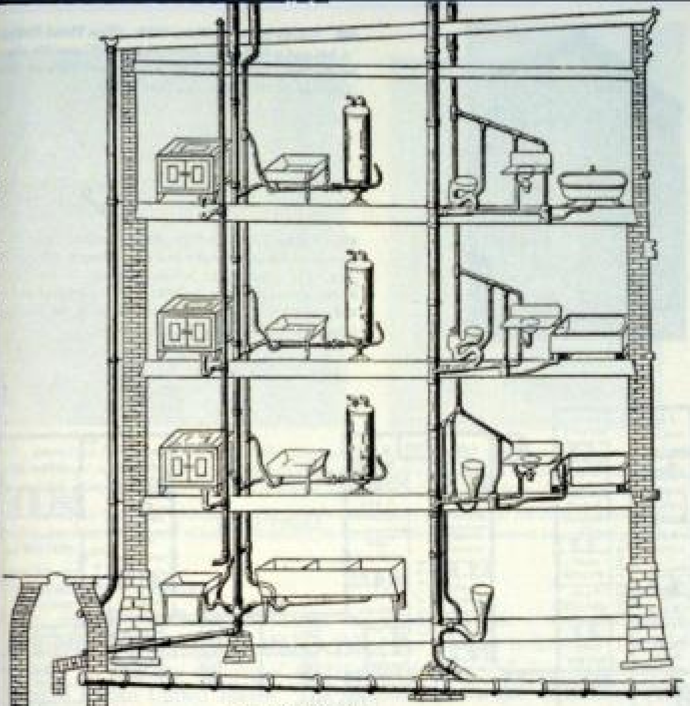
Prince Albert's Model Houses.



489. CATHERINE BEECHER: Plan of a City Flat, with Built-in Bedroom, Kitchenette, and Bath, 1869. *Just as Catherine Beecher's kitchen anticipates the present-day kitchen in its arrangement (fig. 336), her layout of a city flat realizes, in primitive form, the unit of bathroom, bedroom, and enclosed kitchenette.* (The American Woman's Home, 1869)

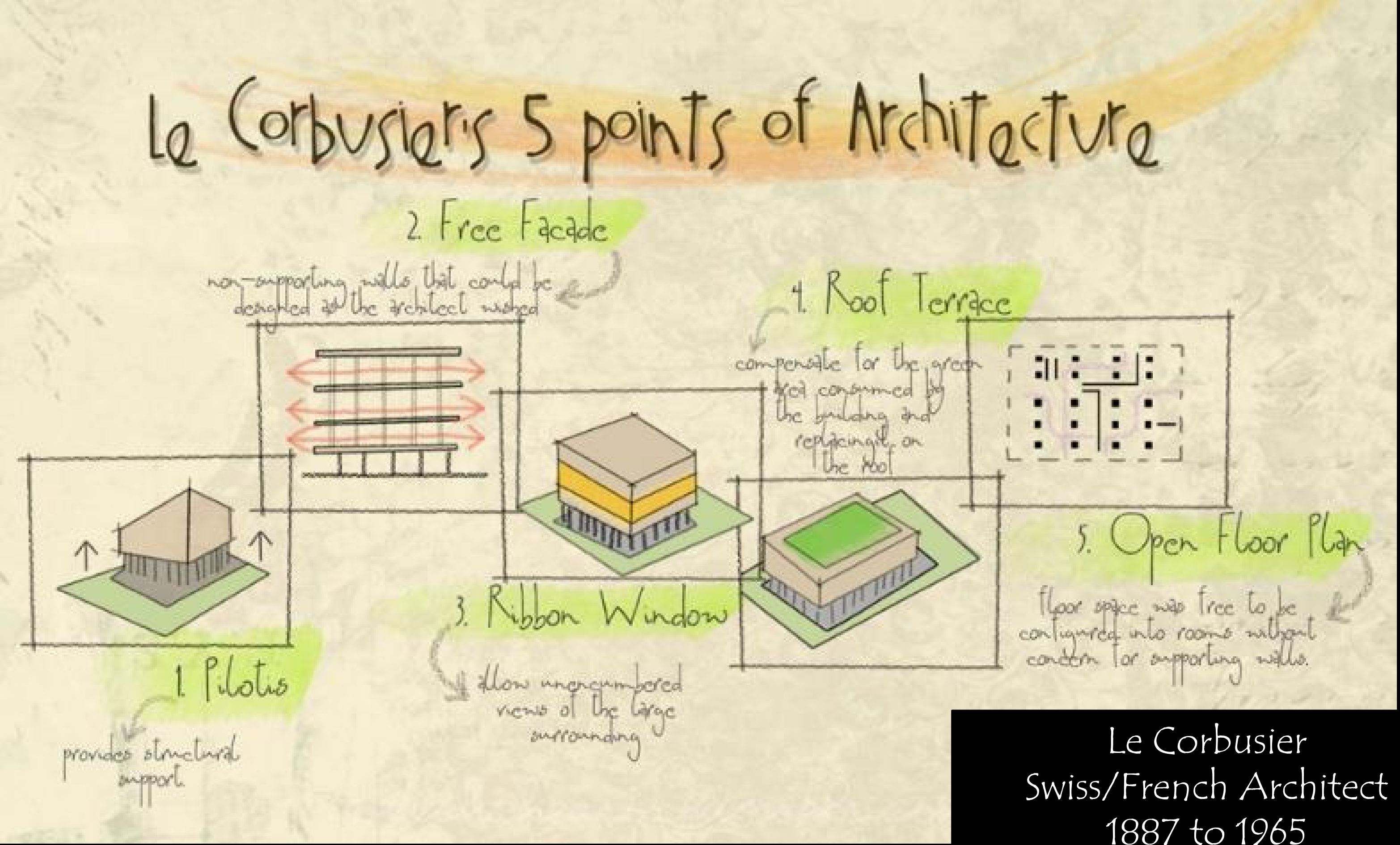


490. One-Room Apartment with Kitchenette and Bath Back to Back, 1930's. *Left of the entrance, a closet; to its right, an open kitchenette, which a wall separates from the bathroom. This wall carries the fixtures for both.* (850 *Seventh Avenue, New York. Sketch by Florence Schust*)

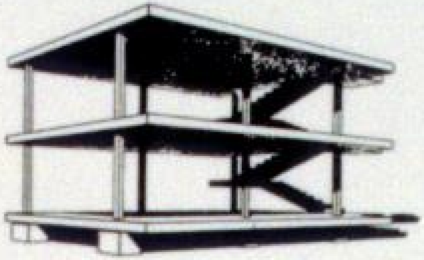


491. Chicago Apartment-House Plumbing, 1891. *The Chicago apartment houses of the 'nineties, which incorporated the most advanced standards, already show the fixtures aligned along one wall, but not in the most compact way. The bathtub is still set against the long wall. Later it will be turned 90°, as will the toilet.* (*Industrial Chicago*, 1891)

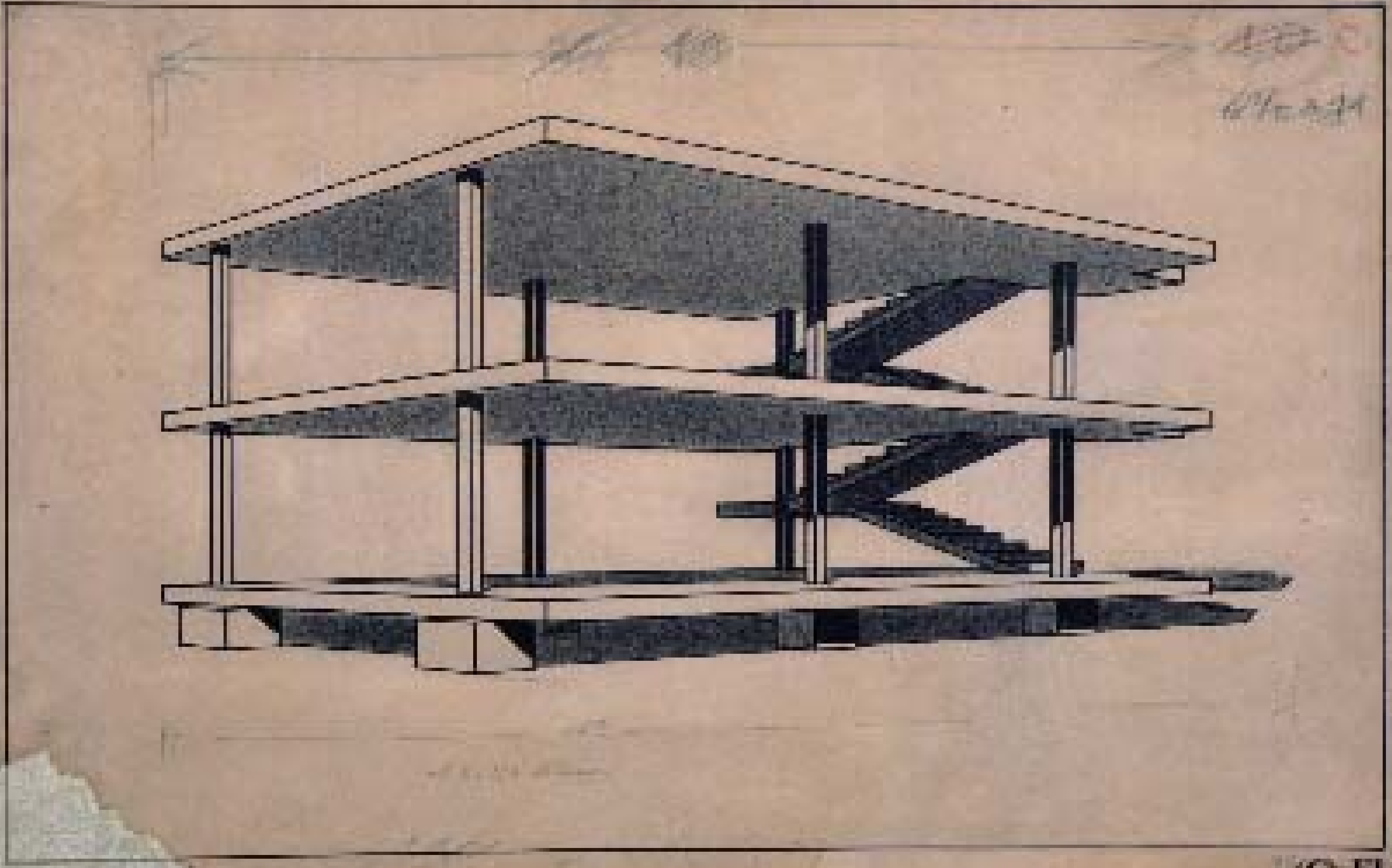
Like Pullman's sleeping car *The Pioneer* (1865), this marked an important step toward the democratization of comfort, when a middle-class hotel was built around a standard living unit of bedroom, bath, and closet. In Europe, even today, the combination of a room with private bath borders on luxury. Putting into practice the maxim 'a bath to every bedroom' immediately influenced the whole plan (figs. 492–4), and was as decisive for the hotel as the organization of the bath and kitchen for the plan of the private house. At once the standard American layout had appeared: The bath is a cell and an appendage to the bedroom.



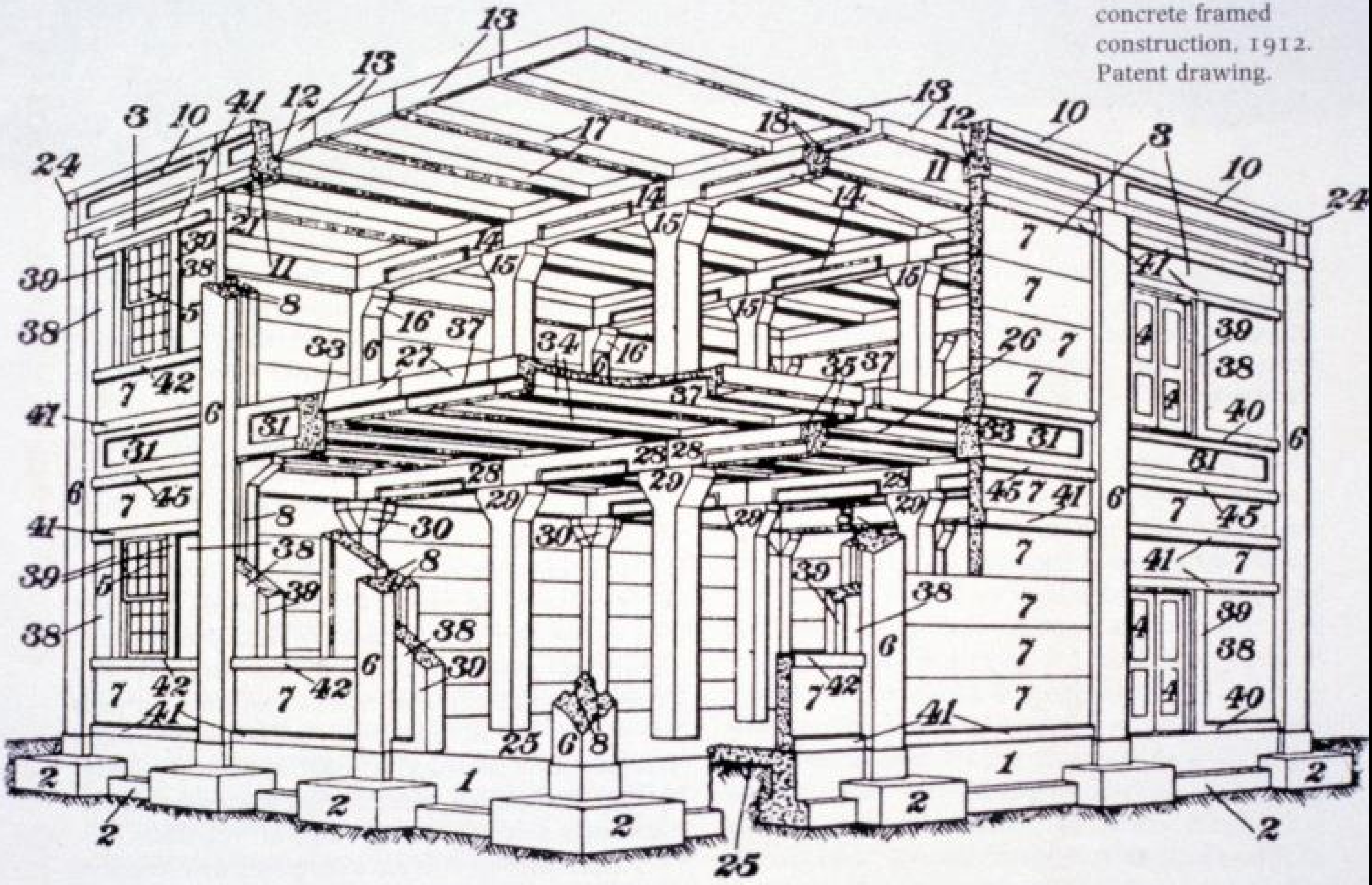
Le Corbusier
Swiss/French Architect
1887 to 1965



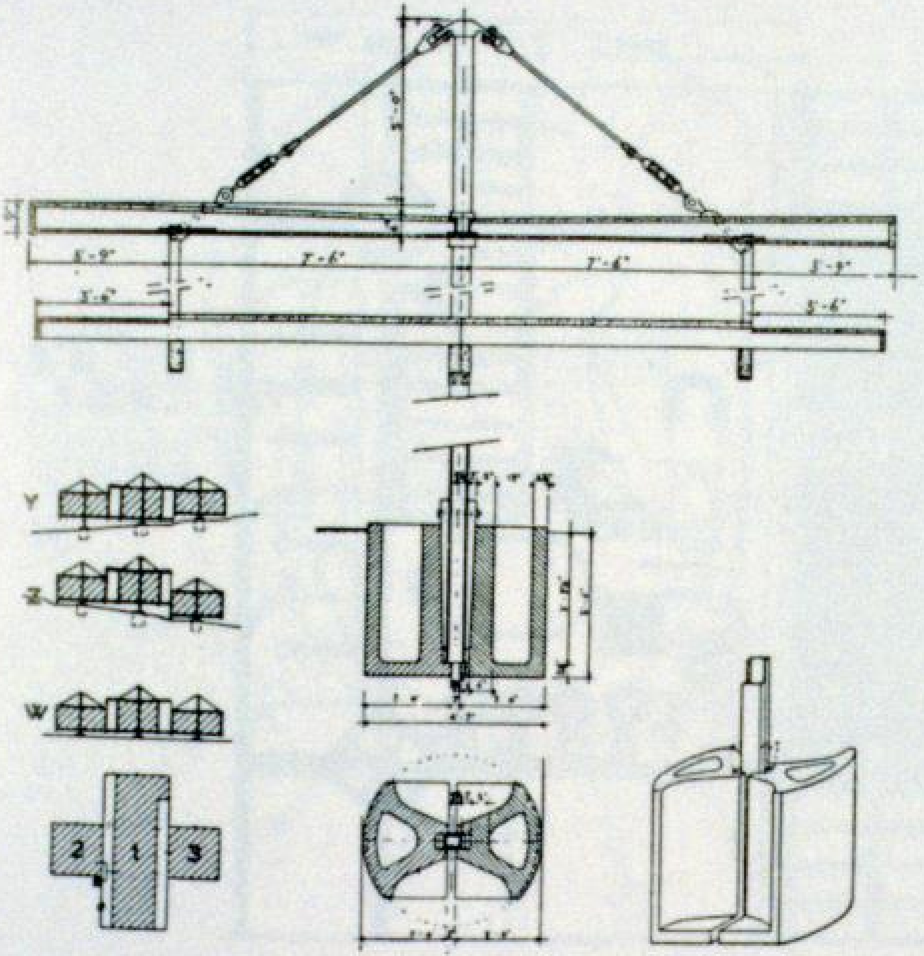
"In the next twenty years, big industry will have co-ordinated its standardized materials . . . technical achievements will have carried . . . methods of rational construction far beyond anything we are acquainted with."
—Le Corbusier, 1914



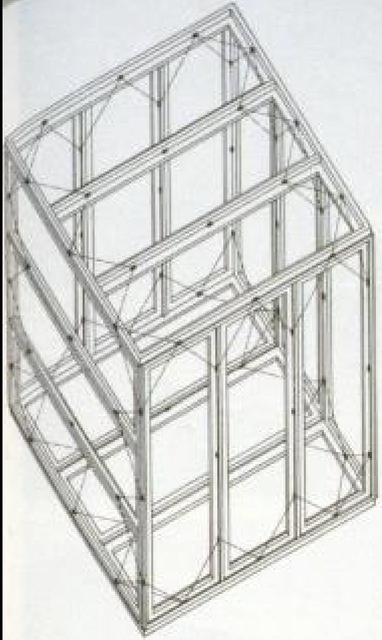
4.10 Conzelman system of precast-concrete framed construction, 1912. Patent drawing.

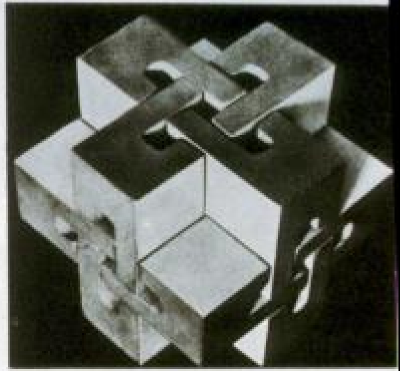


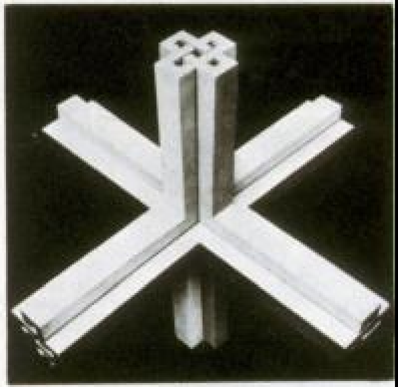
The Birth of Modular Design

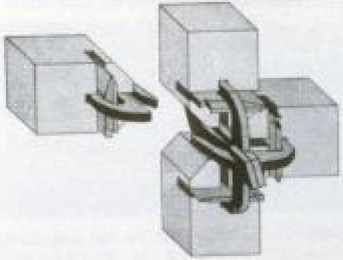


155 Neutra, One-Plus-Two prefabricated extendable family house, 1926. Details of structural support and assembly pattern.





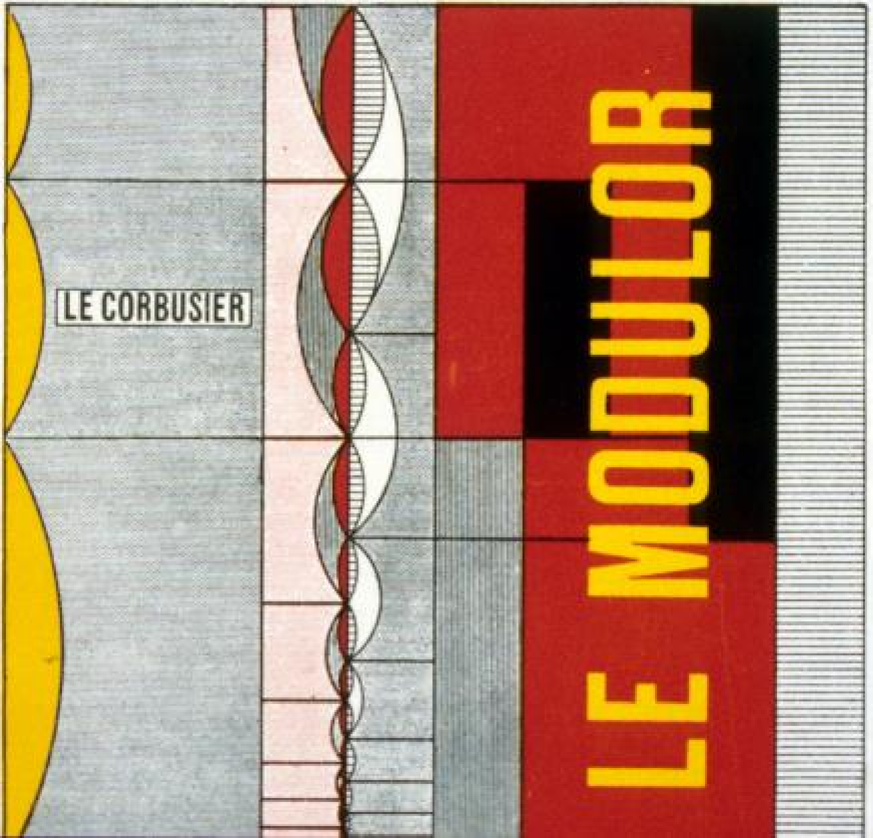


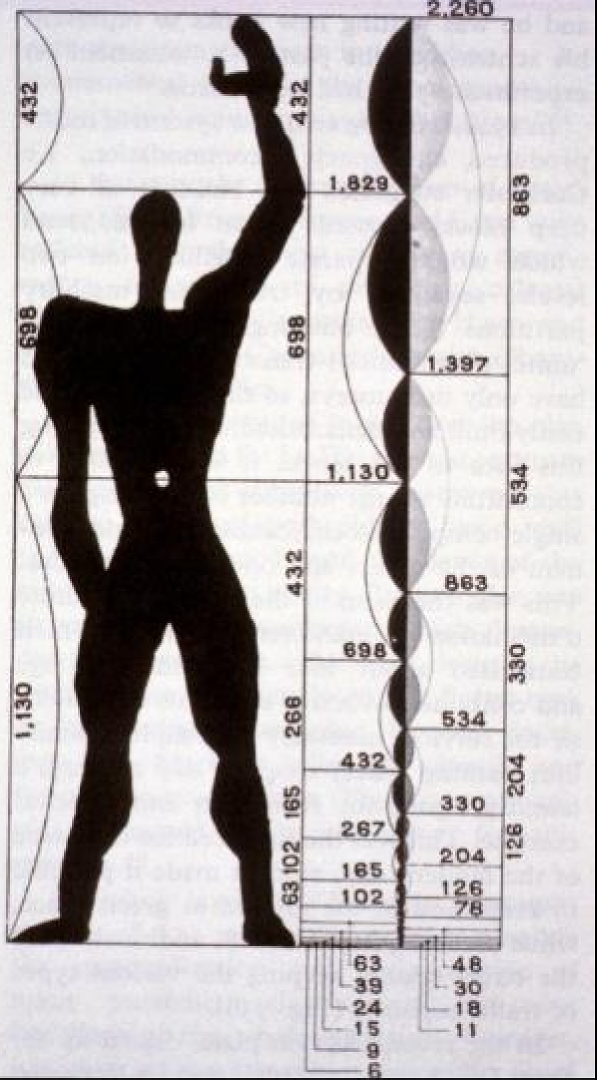


819–822 *Details of the packaged house system worked on by Gropius and Wachsmann in 1942 for the General Panel Corp.* (from K.W., The Turning-point of Building)

THE MODULOR

Le Corbusier




2,260
432
432
1,829
863
698
698
1,397
1,130
534
432
863
1,130
698
330
266
534
432
204
165
330
267
126
102
204
165
126
63
102
78
63
39
24
15
9
6
48
30
18
11

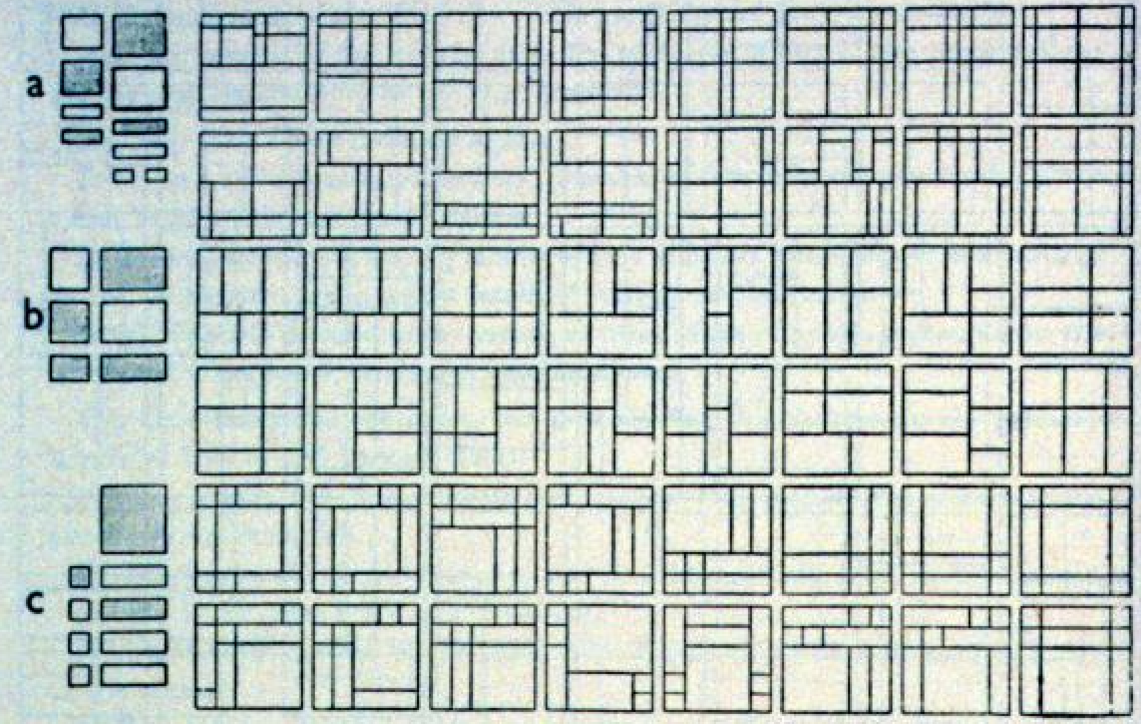


Fig. 40

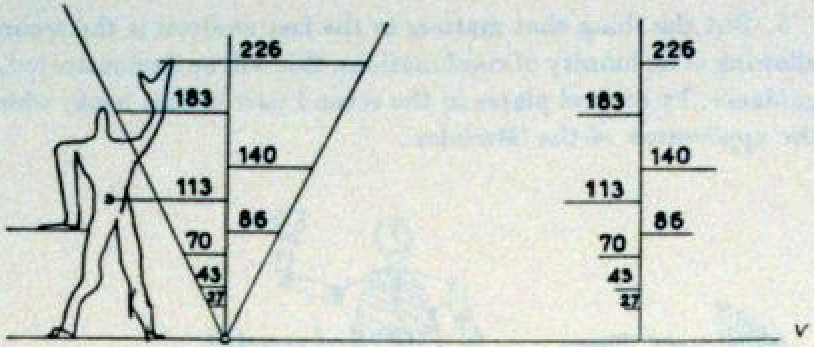


Fig. 25

They may be drawn as follows:

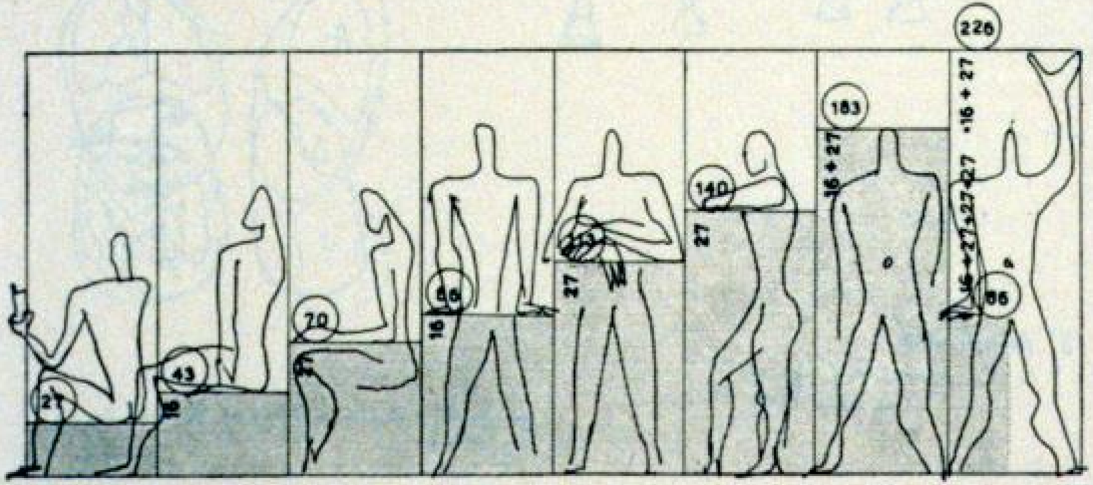


Fig. 26

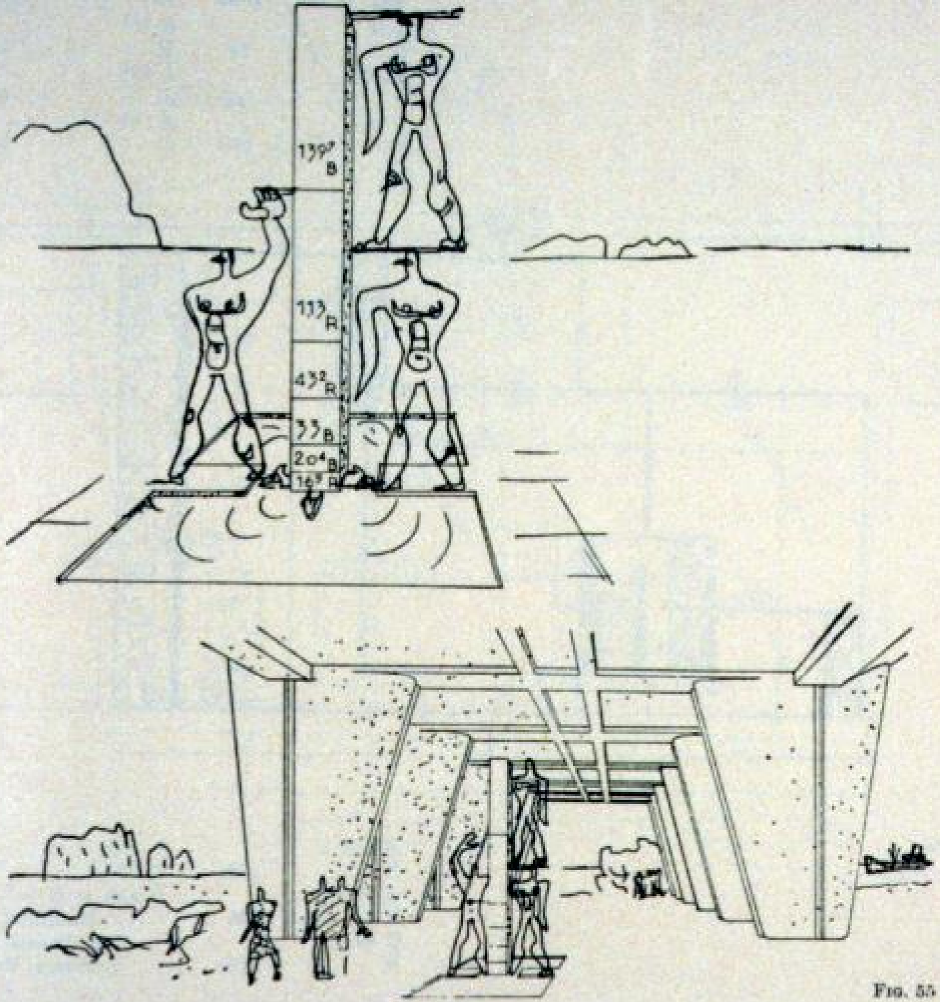
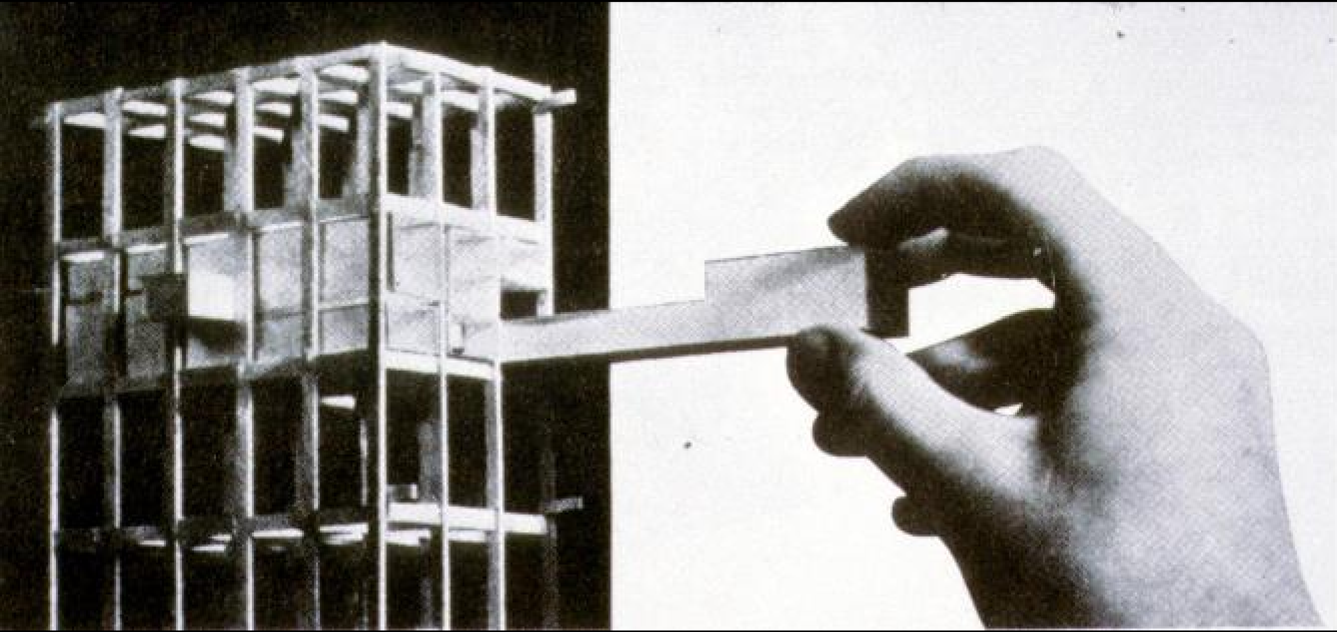
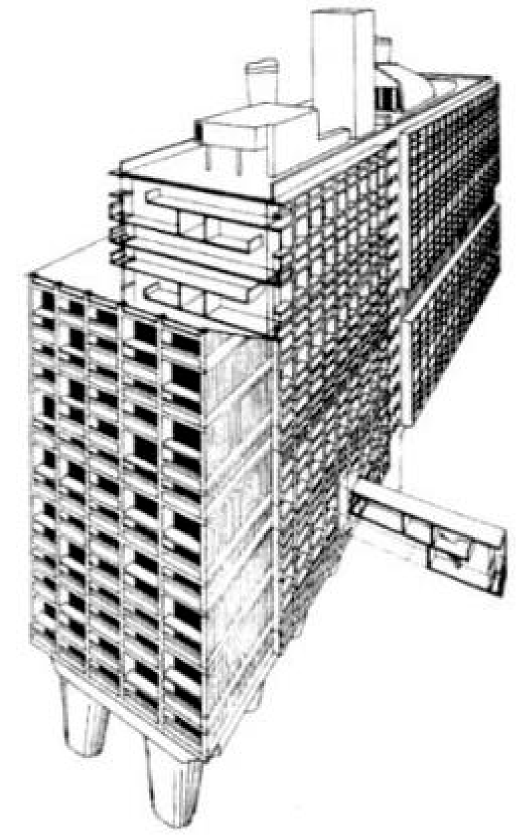


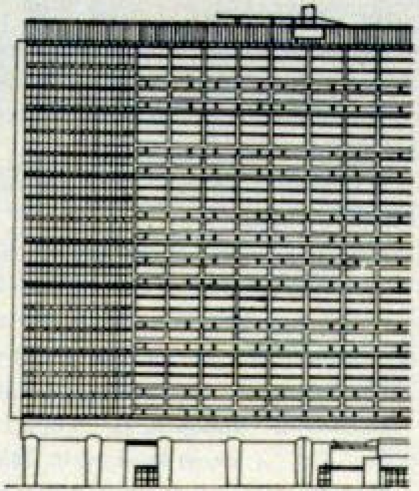
Fig. 55

Unite d'habitation
Marseille, France
1947 to 1952
Le Corbusier





	Series	
	Red	Blue
A	65^{5}	
B	165^{5}	
C		20^{5}
D		33
E	43	
F		53
G	70	
H		86
I	113	
J		226
K	296	
L		336
M	419 = L + F	



5

6

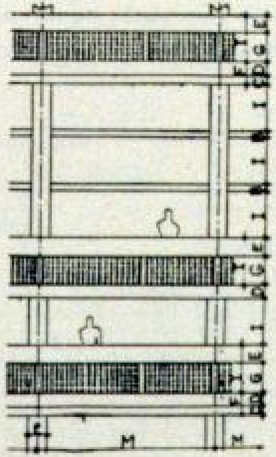
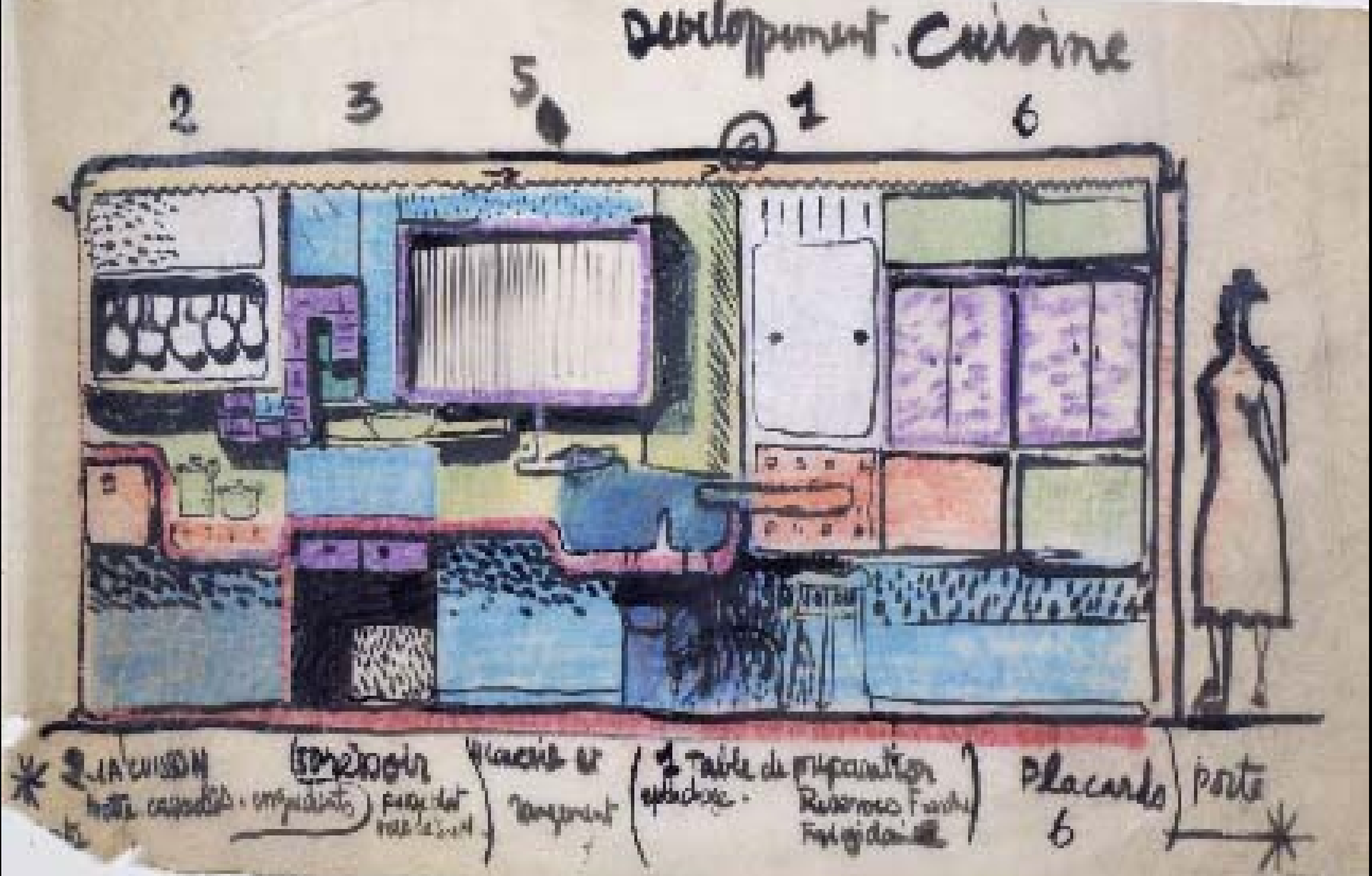
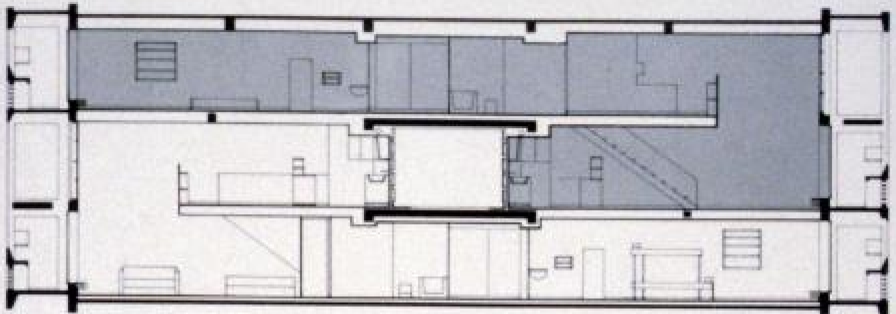
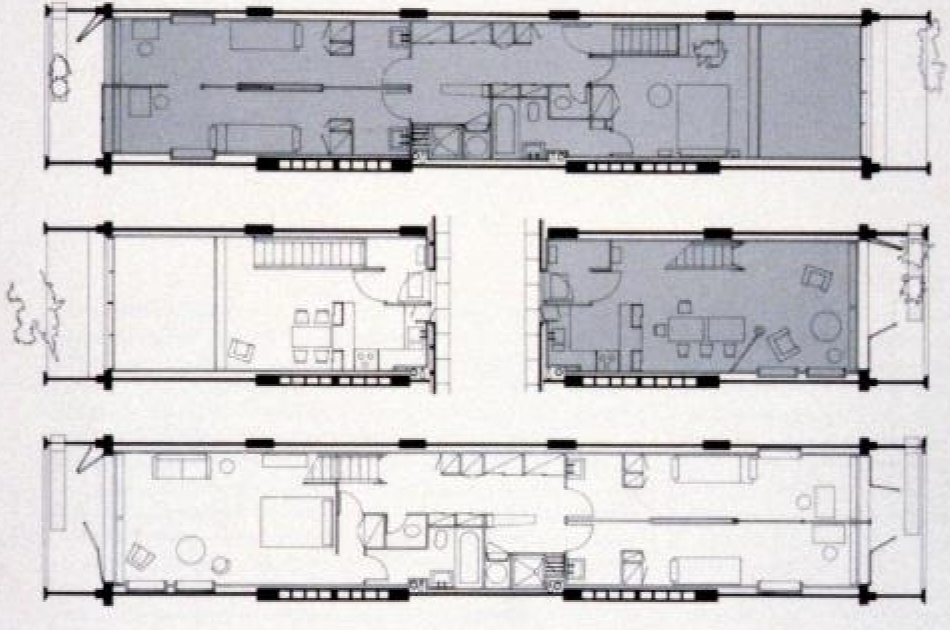


FIG. 50

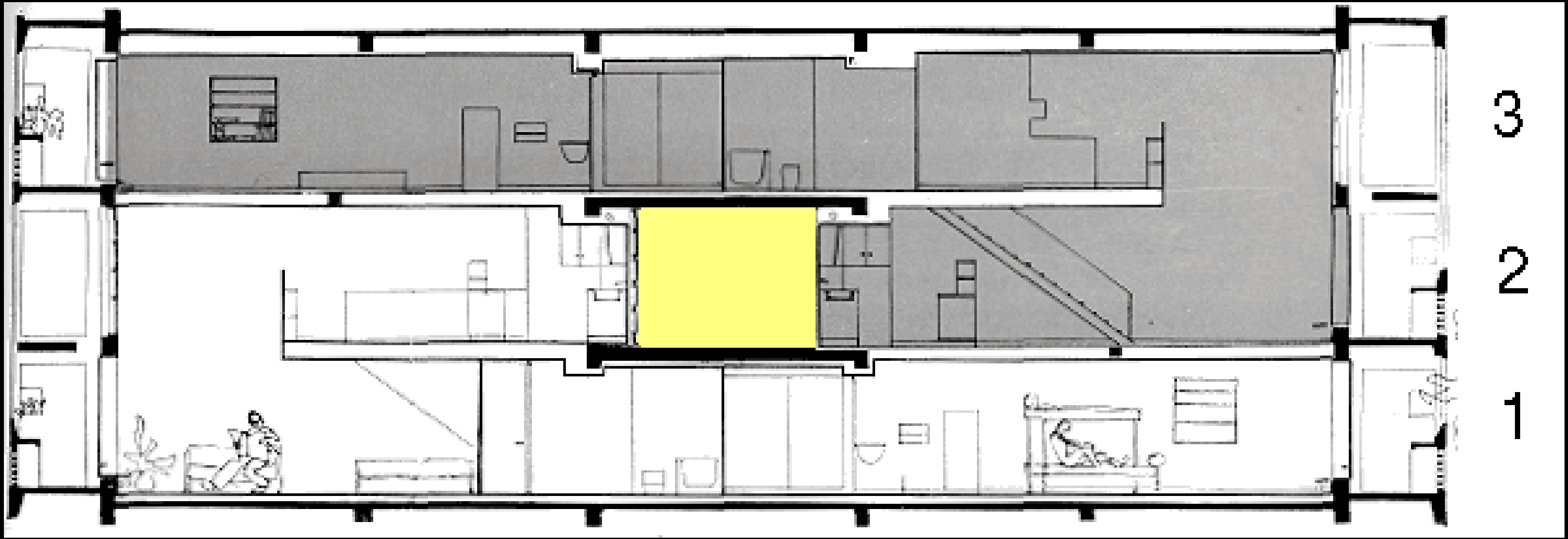

Development Cuisine
2
3
5
1
6
Placards
6
porte



Apartment unit section and plans.



L'Unité d'habitation in Berlin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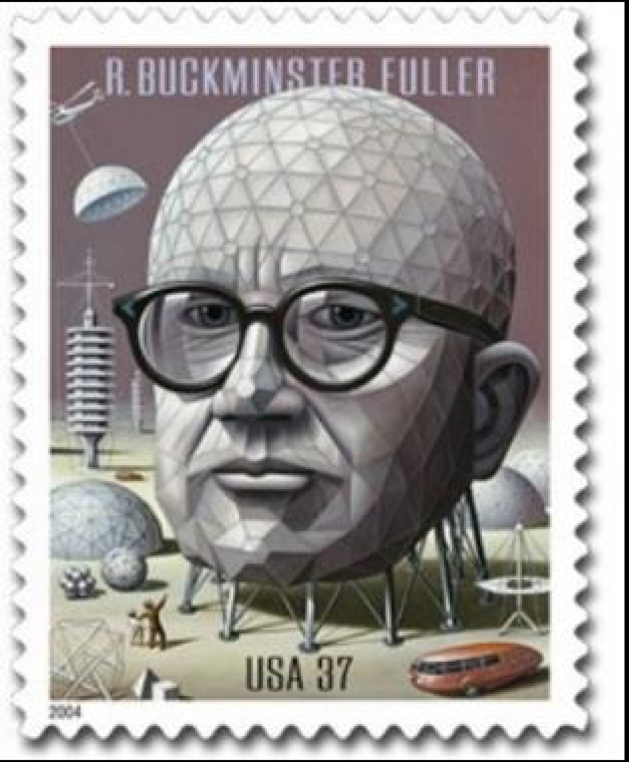
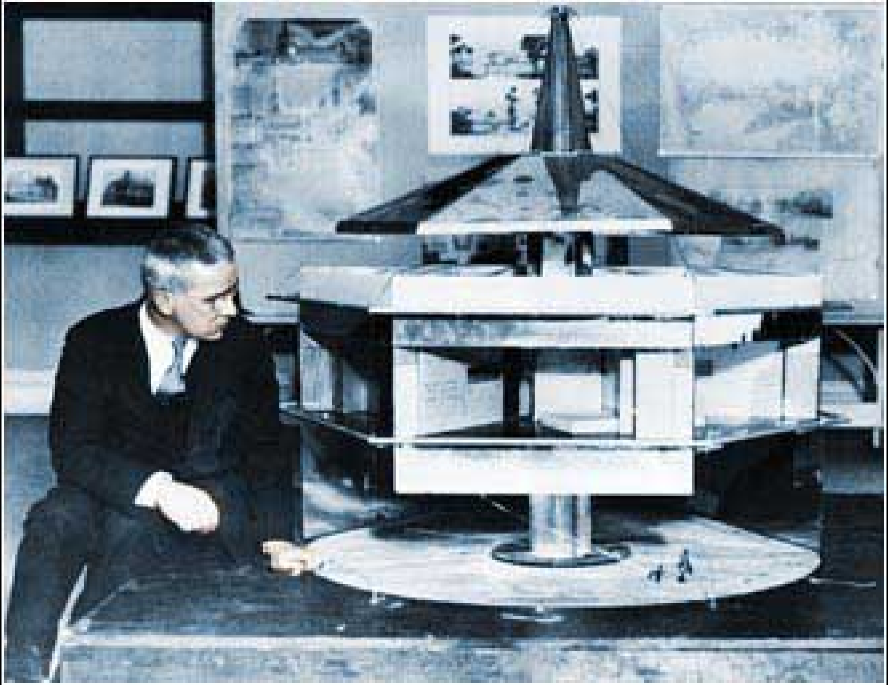
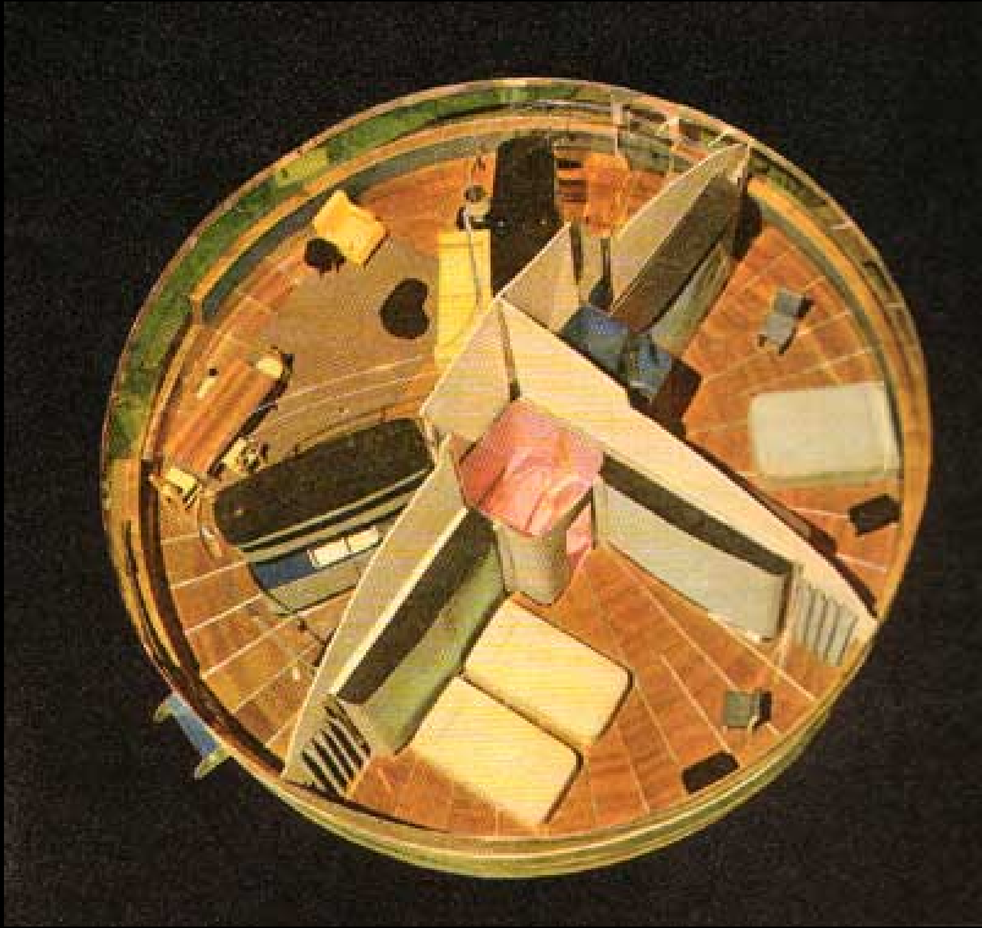


Buckminster Fuller
American Architect
1895 to 1983

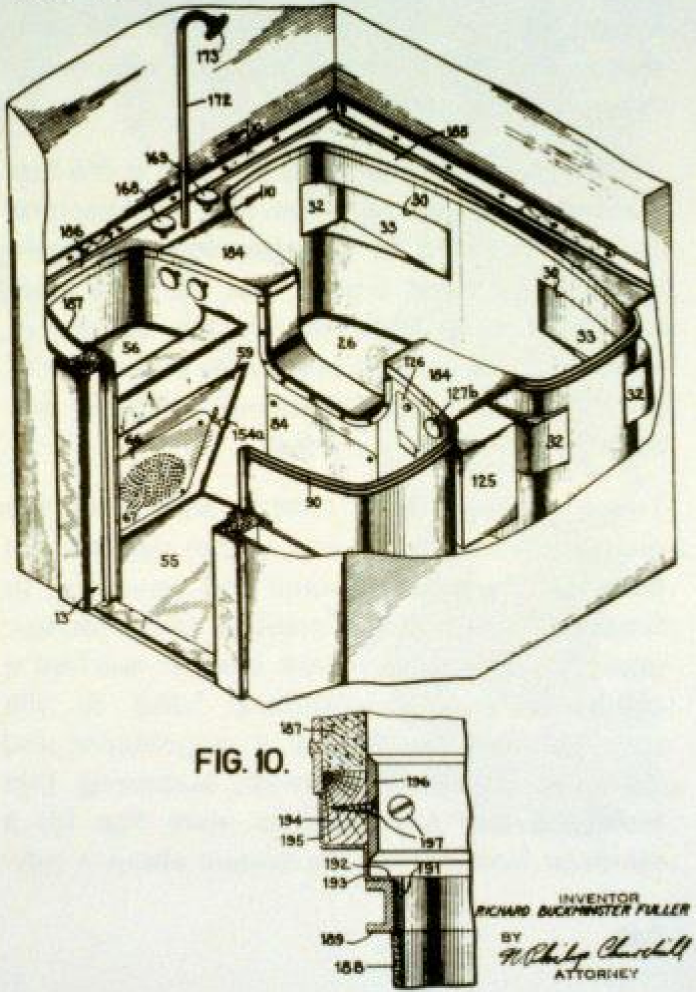
Buckminster Fuller's dymaxion principles signified "dynamism plus efficiency"

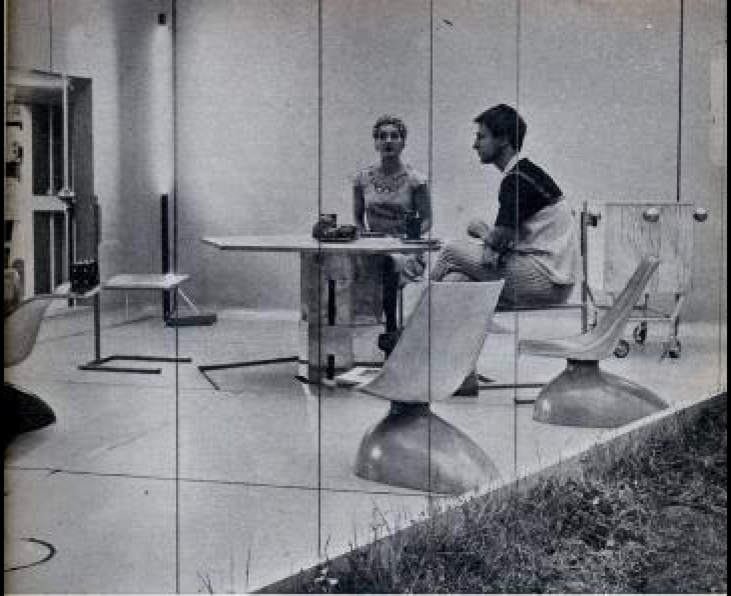





Thank you
Touring
Open House

236 Fuller, prefabricated bathroom, patented 1938–40.



Main room of 1980 home adjoins central garden. The dining table can sink into floor.

This is a House?

British architects have designed this Home Of The Future to prove that living will be much easier in the brave new world of tomorrow.

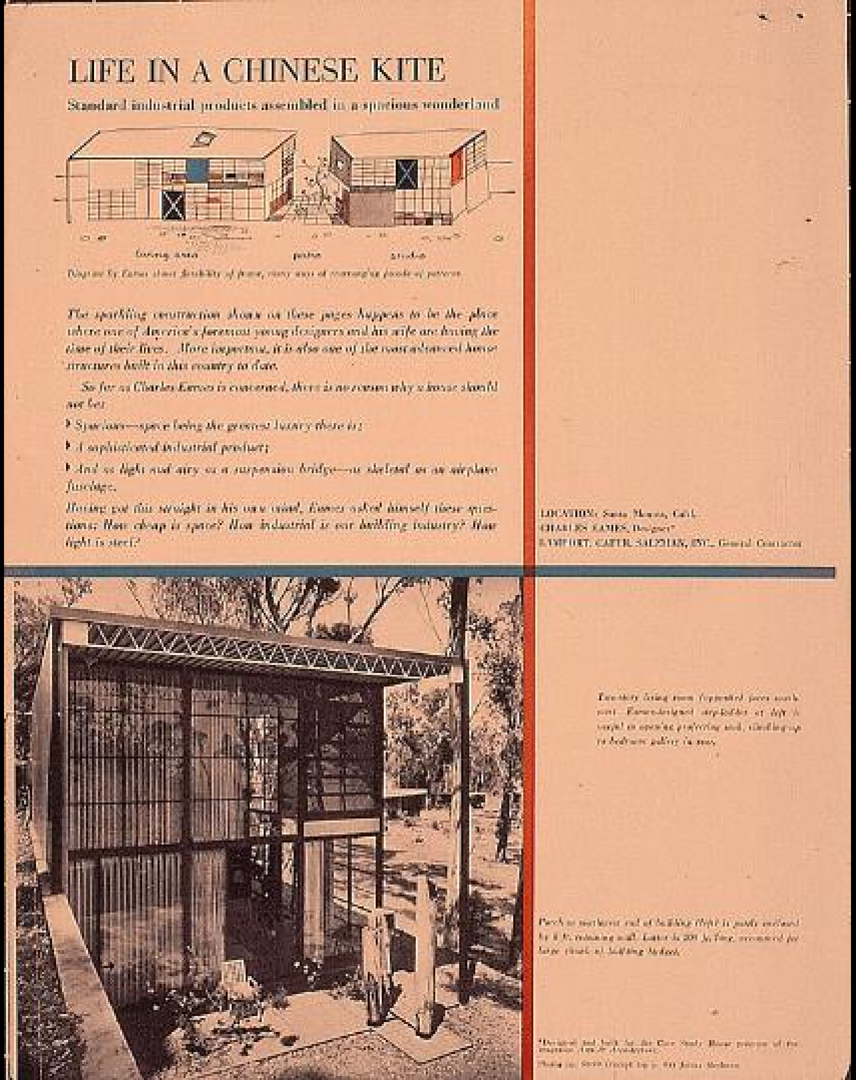
Short-wave transmitter with push buttons controls radio-phonograph-color TV set.

STAR of the London Daily Mail Ideal Home Exhibition of 1956 was this eye-opening Home Of The Future designed by architects Alison and Peter Smithson. It is a one-bedroom town house that contains a garden within it. The shell is moulded of plastic-impregnated plaster and the roof is covered with aluminum foil to reflect the sun's

1956 – Peter and Alison Smithson's
"house of the future"

The Jetsons
1963

"custom" vs "off-the-shelf"
repeated elements



LIFE IN A CHINESE KITE

Standard industrial products assembled in a spacious wonderland

The sparkling construction shown on these pages happens to be the place where one of America's foremost young designers and his wife are having the time of their lives. More important, it is also one of the most advanced house structures built in this country to date.

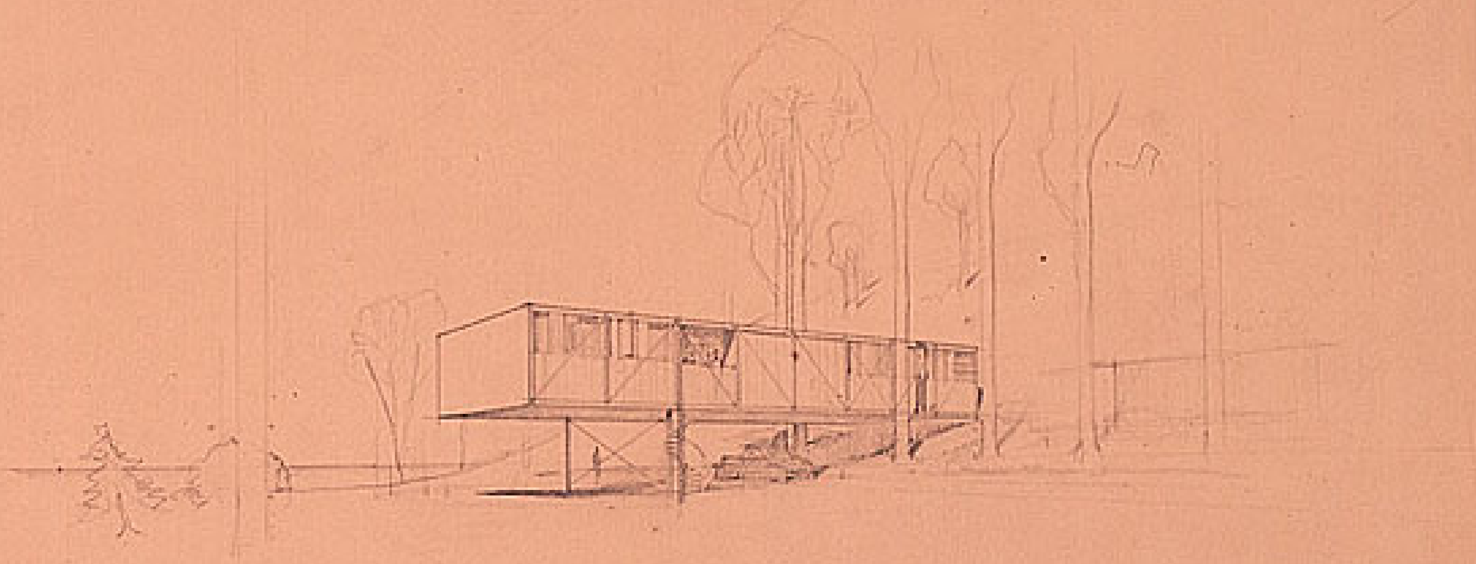
So far as Charles Eames is concerned, there is no reason why a house should not be:

- *Spacious—space being the greatest luxury there is;*
- *A sophisticated industrial product;*
- *And as light and airy as a suspension bridge—as skeletal as an airplane fuselage.*

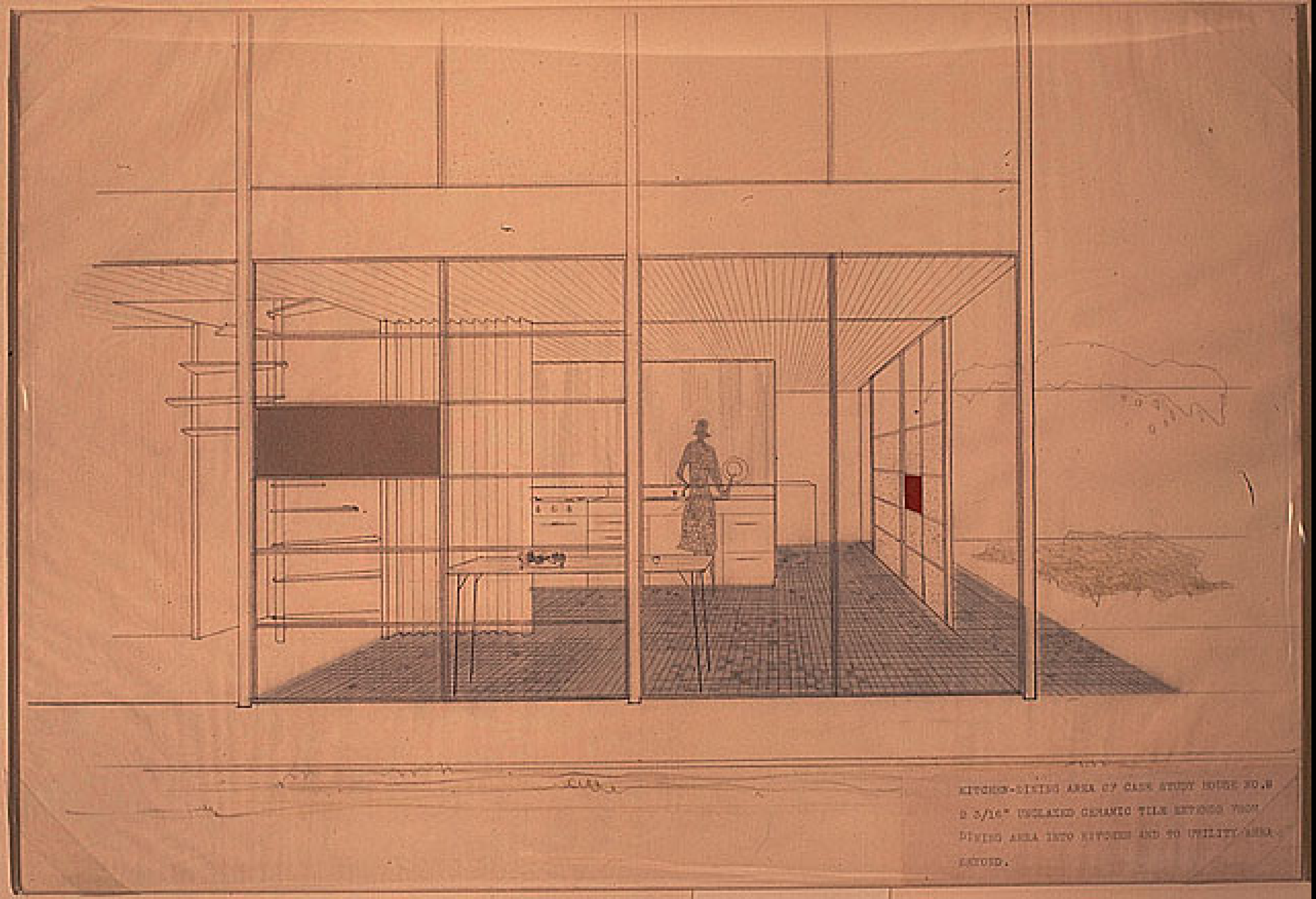
Having got this straight in his own mind, Eames asked himself these questions: How cheap is space? How industrial is our building industry? How light is steel?

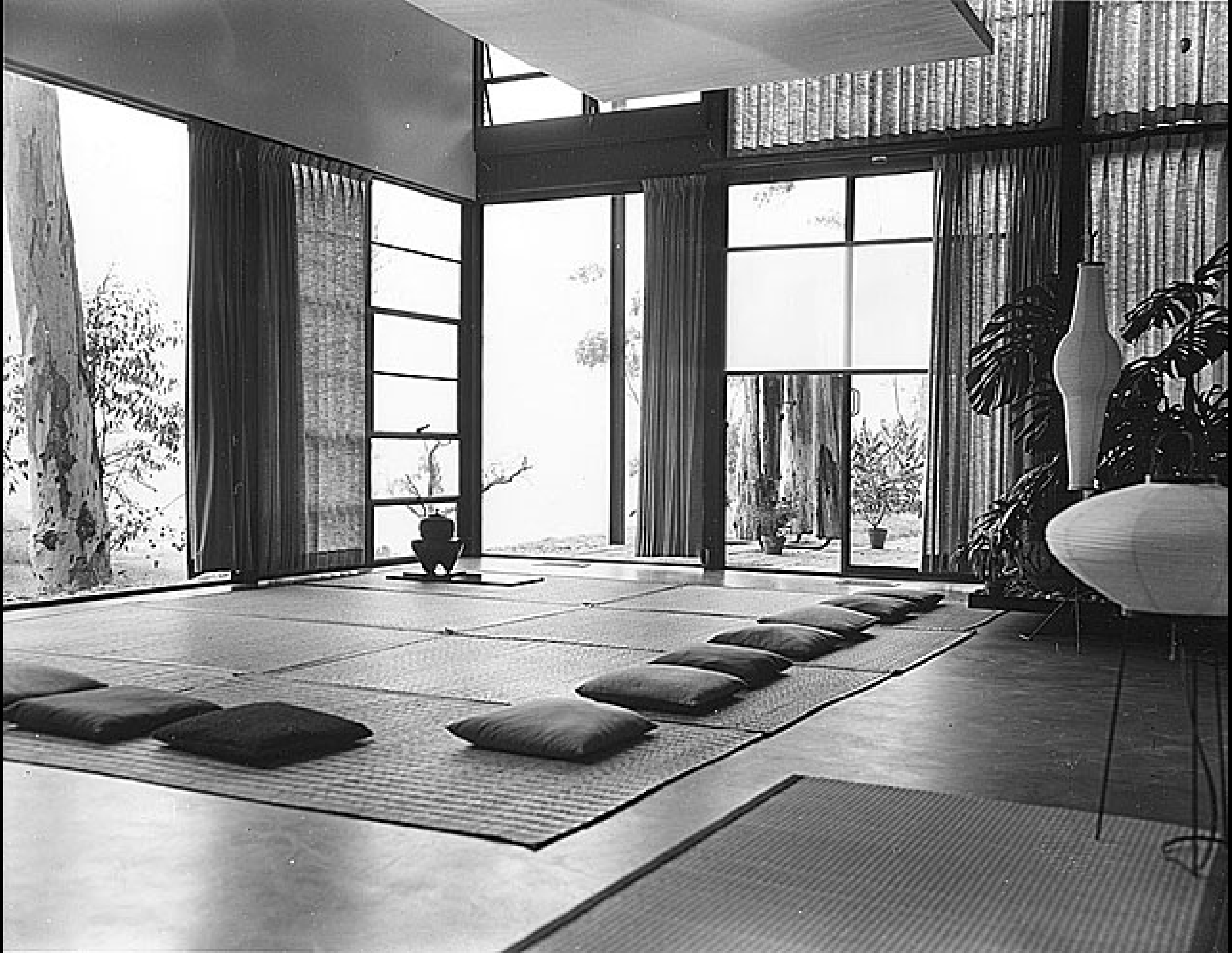
LOCATION: Santa Monica, Calif.
CHARLES EAMES, Designer

Case Study House No. 8
Pallisades, California
Charles and Ray Eames
1949

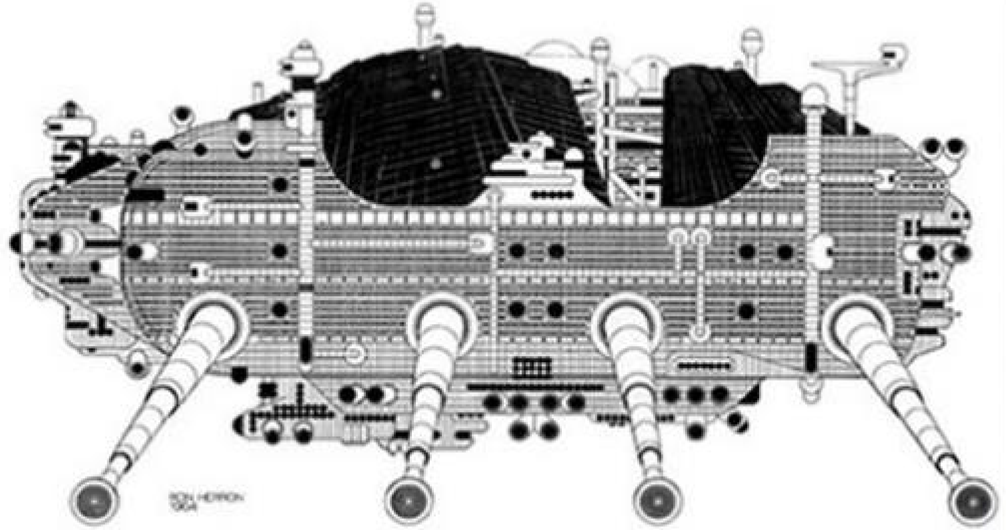


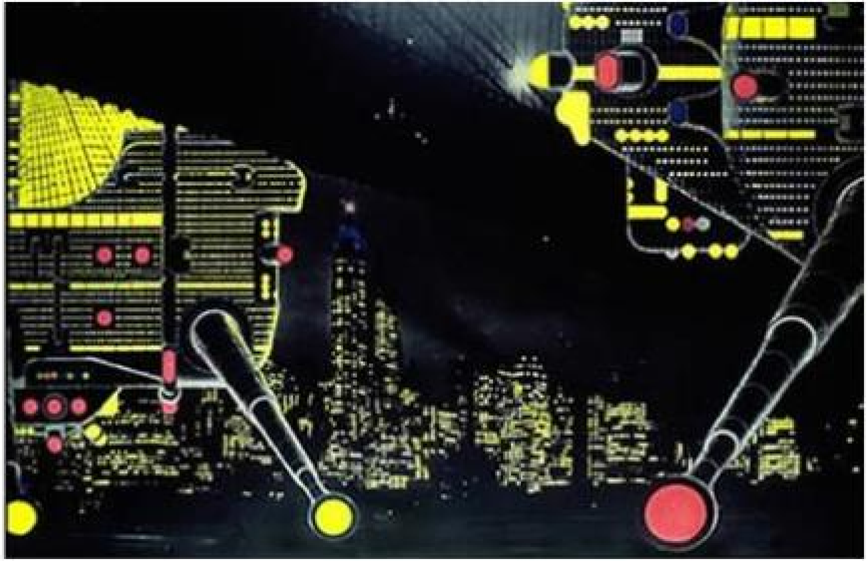
Bottom Page 9

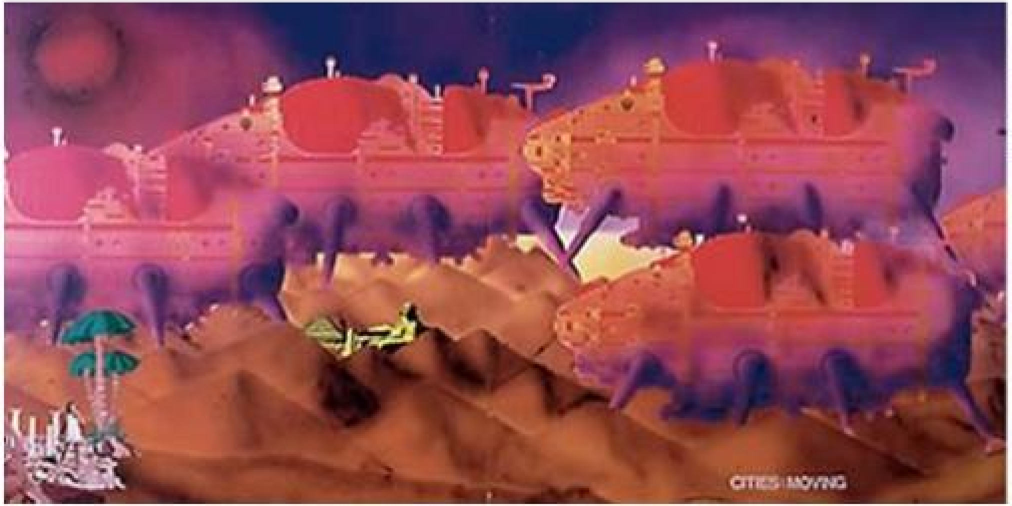

KITCHEN-DINING AREA OF CASE STUDY HOUSE NO.8
2 3/16" UNGLAZED CERAMIC TILE EXTENDS FROM
DINING AREA INTO KITCHEN AND TO UTILITY AREA
BEYOND.

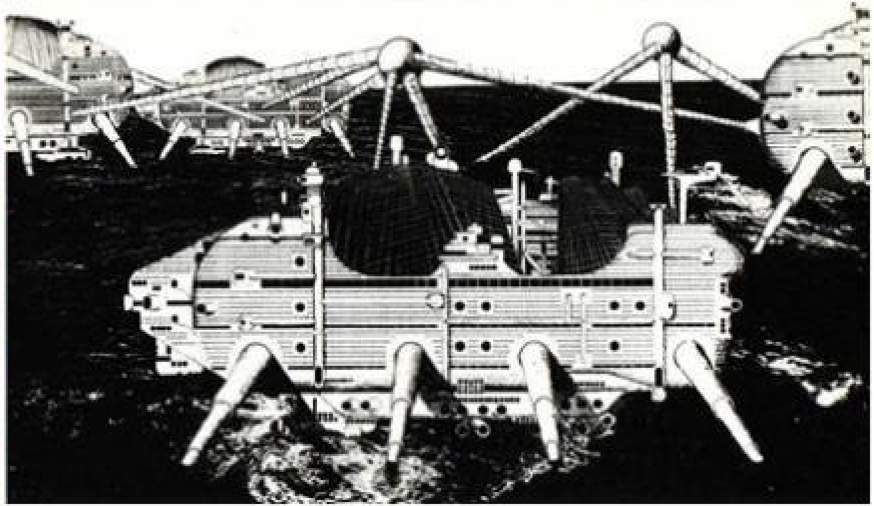


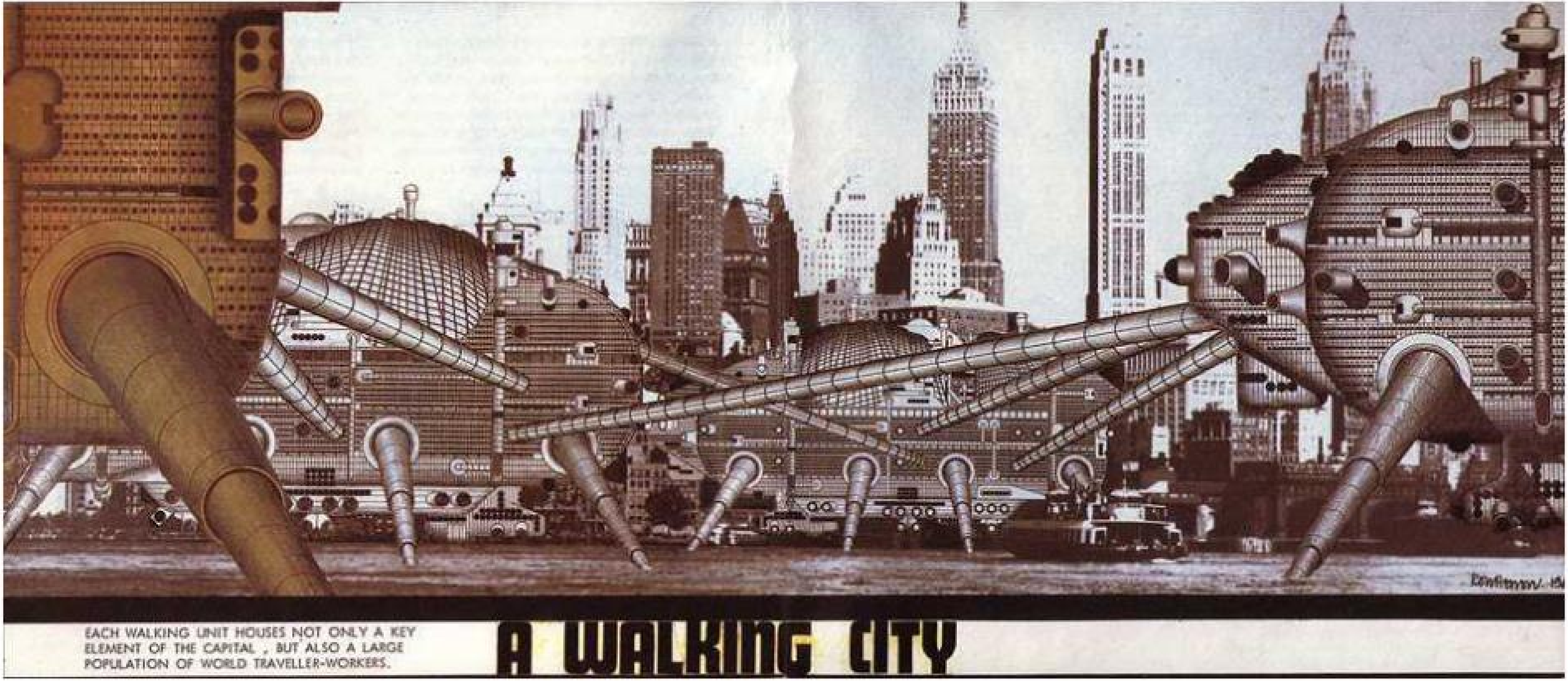
Archigram
Avant-garde British Design Group
1960s

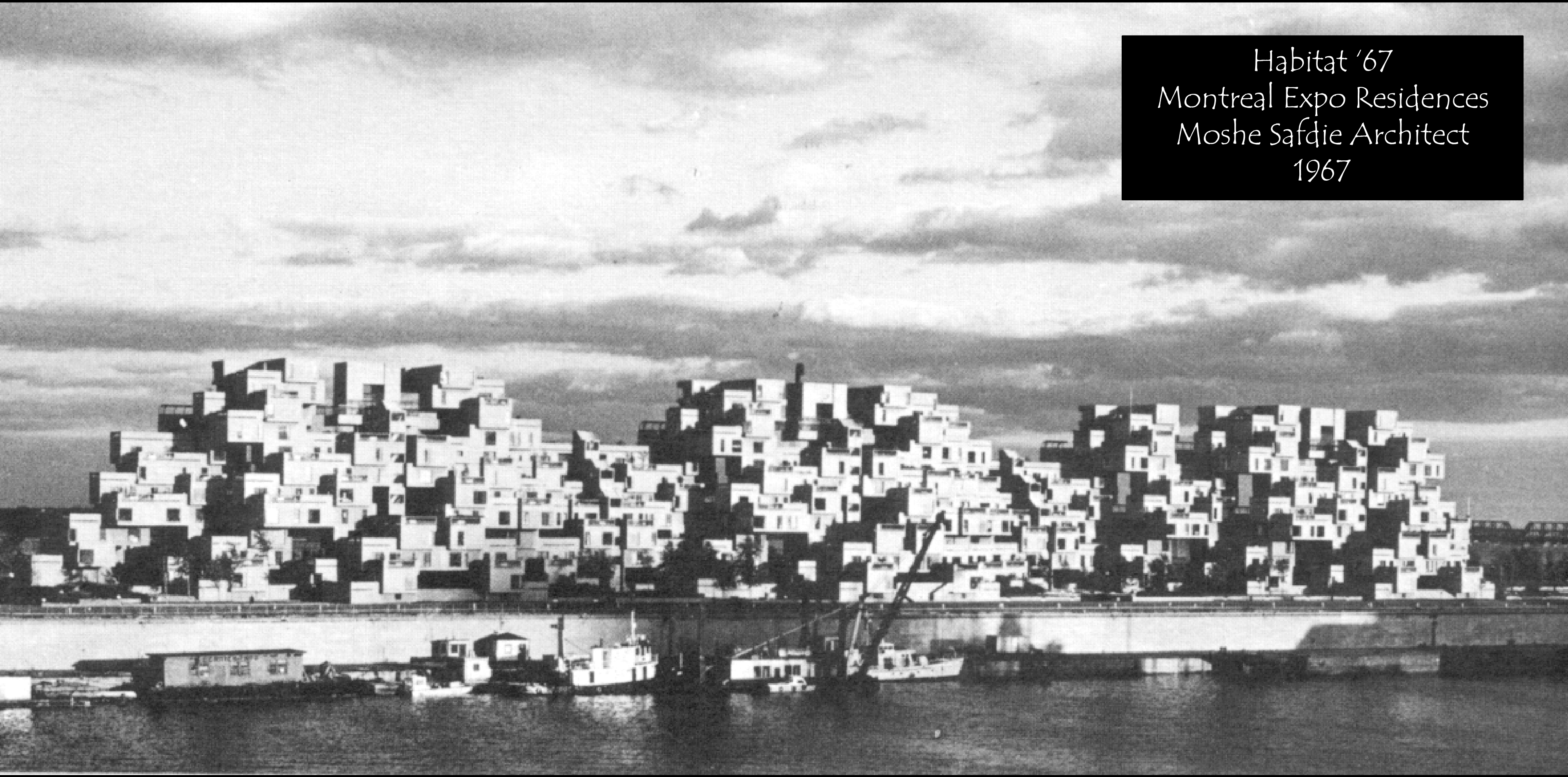

RON HERRON



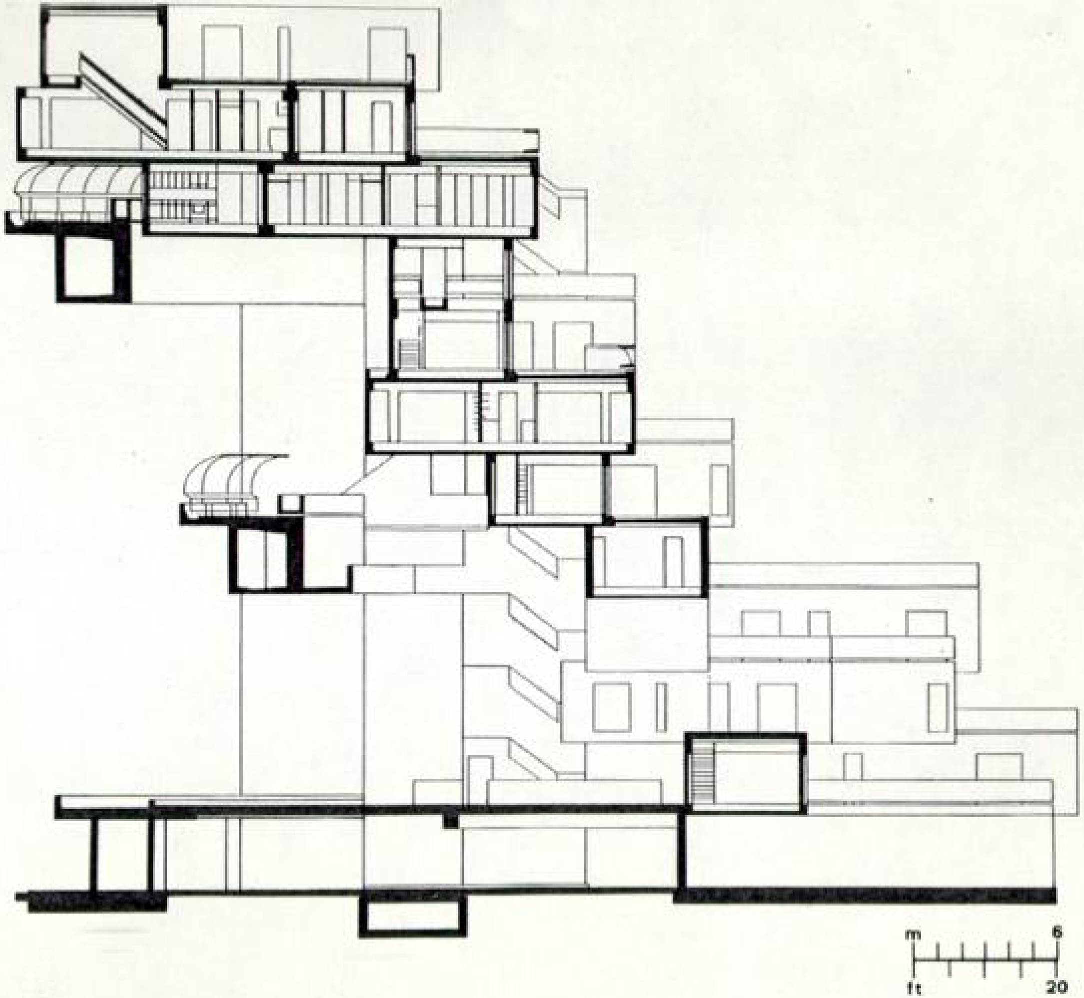

CITIES MOVING




EACH WALKING UNIT HOUSES NOT ONLY A KEY ELEMENT OF THE CAPITAL , BUT ALSO A LARGE POPULATION OF WORLD TRAVELLER-WORKERS.
A WALKING CITY



Habitat '67
Montreal Expo Residences
Moshe Safdie Architect
1967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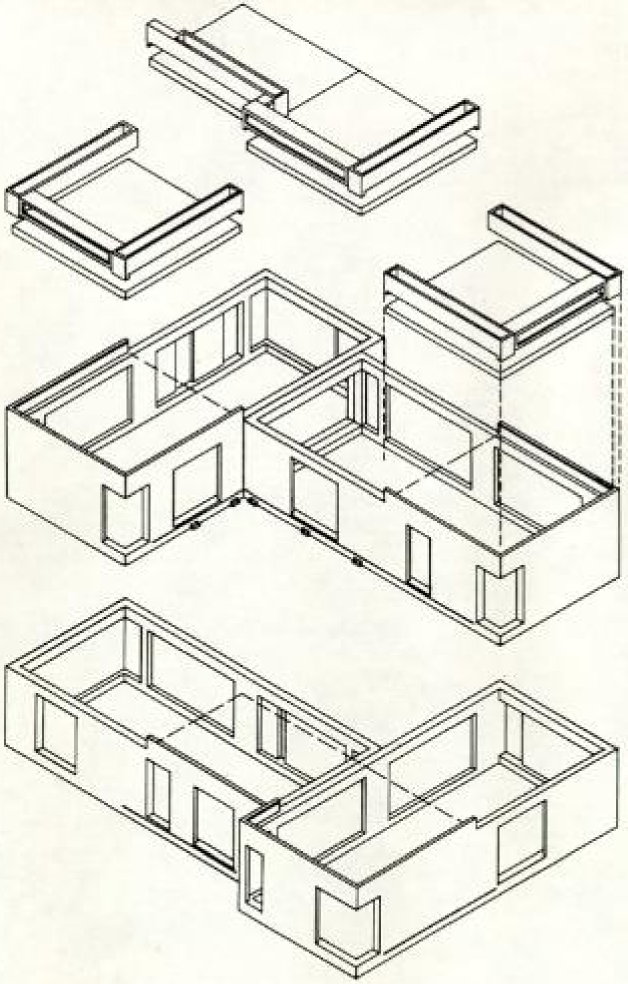
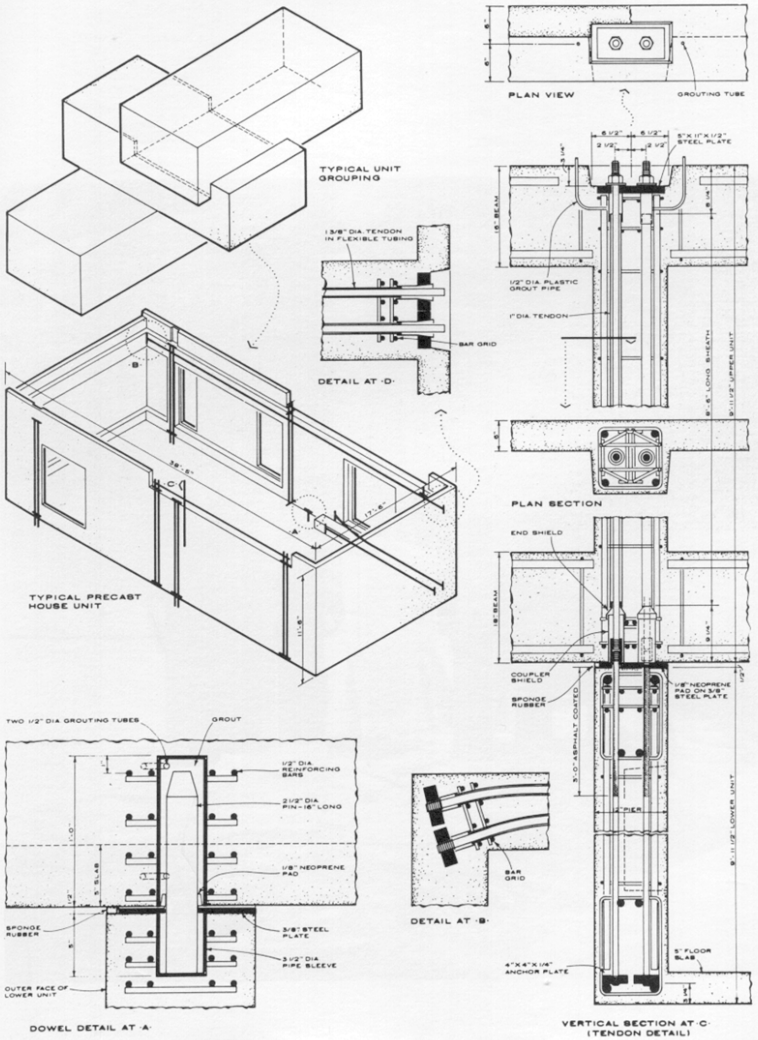
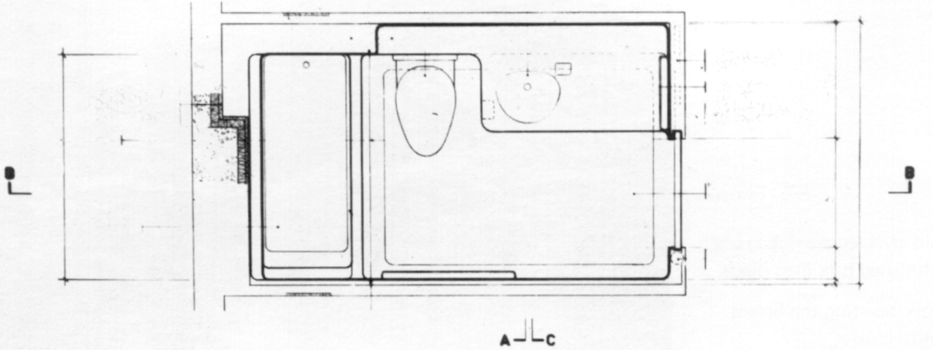
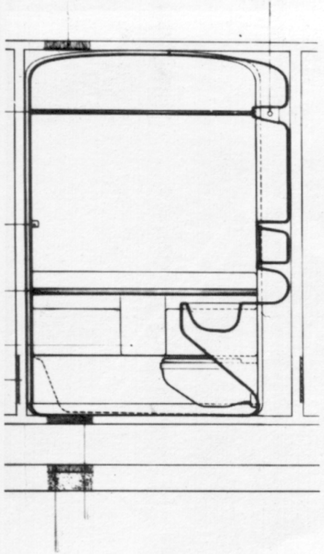


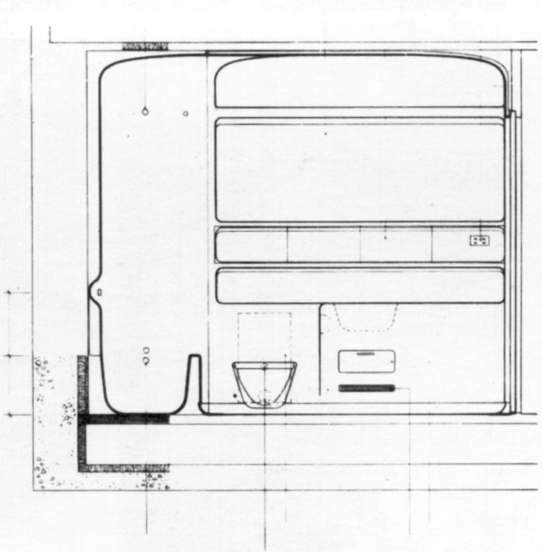

TYPICAL UNIT GROUPING
TYPICAL PRECAST HOUSE UNIT
1 3/8" DIA. TENDON IN FLEXIBLE TUBING
BAR GRID
DETAIL AT ·D·
PLAN VIEW
GROUTING TUBE
5"X 11"X 1/2" STEEL PLATE
16" BEAM
1/2" DIA. PLASTIC GROUT PIPE
1" DIA. TENDON
9'-6" LONG SHEATH
9'-11 1/2" UPPER UNIT
PLAN SECTION
END SHIELD
COUPLER SHIELD
SPONGE RUBBER
3'-0" ASPHALT COATED
1/8" NEOPRENE PAD ON 3/8" STEEL PLATE
12" PIER
9'-11 1/2" LOWER UNIT
5" FLOOR SLAB
4"X 4"X 1/4" ANCHOR PLATE
VERTICAL SECTION AT ·C· (TENDON DETAIL)
TWO 1/2" DIA. GROUTING TUBES
GROUT
1/2" DIA. REINFORCING BARS
2 1/2" DIA. PIN - 16" LONG
1/8" NEOPRENE PAD
5" SLAB
SPONGE RUBBER
3/8" STEEL PLATE
3 1/2" DIA. PIPE SLEEVE
OUTER FACE OF LOWER UNIT
DOWEL DETAIL AT ·A·
BAR GRID
DETAIL AT ·B·



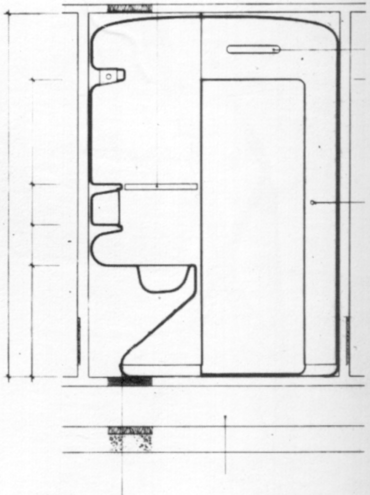
PLAN



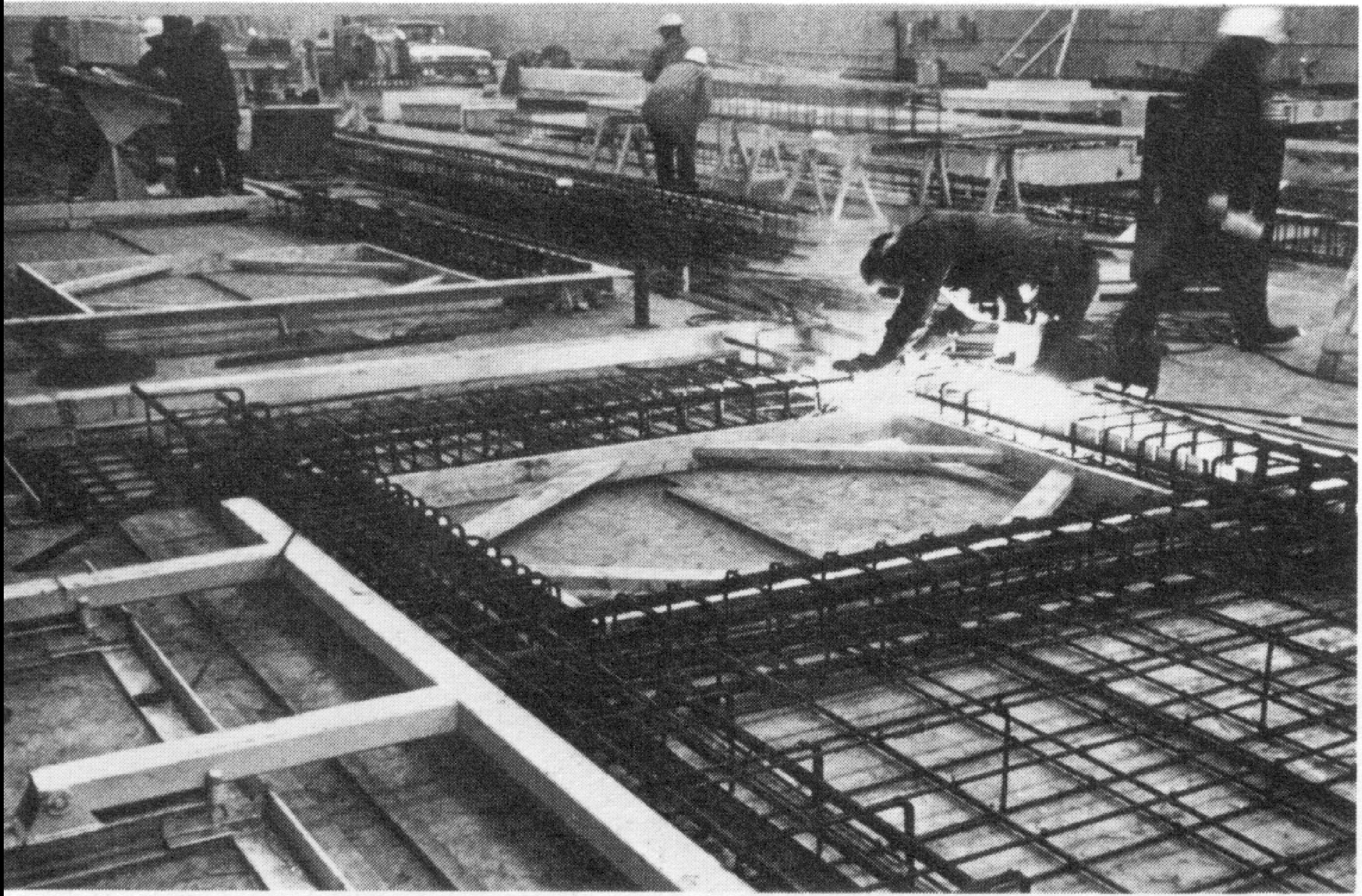
SECTION A-A
COUPE

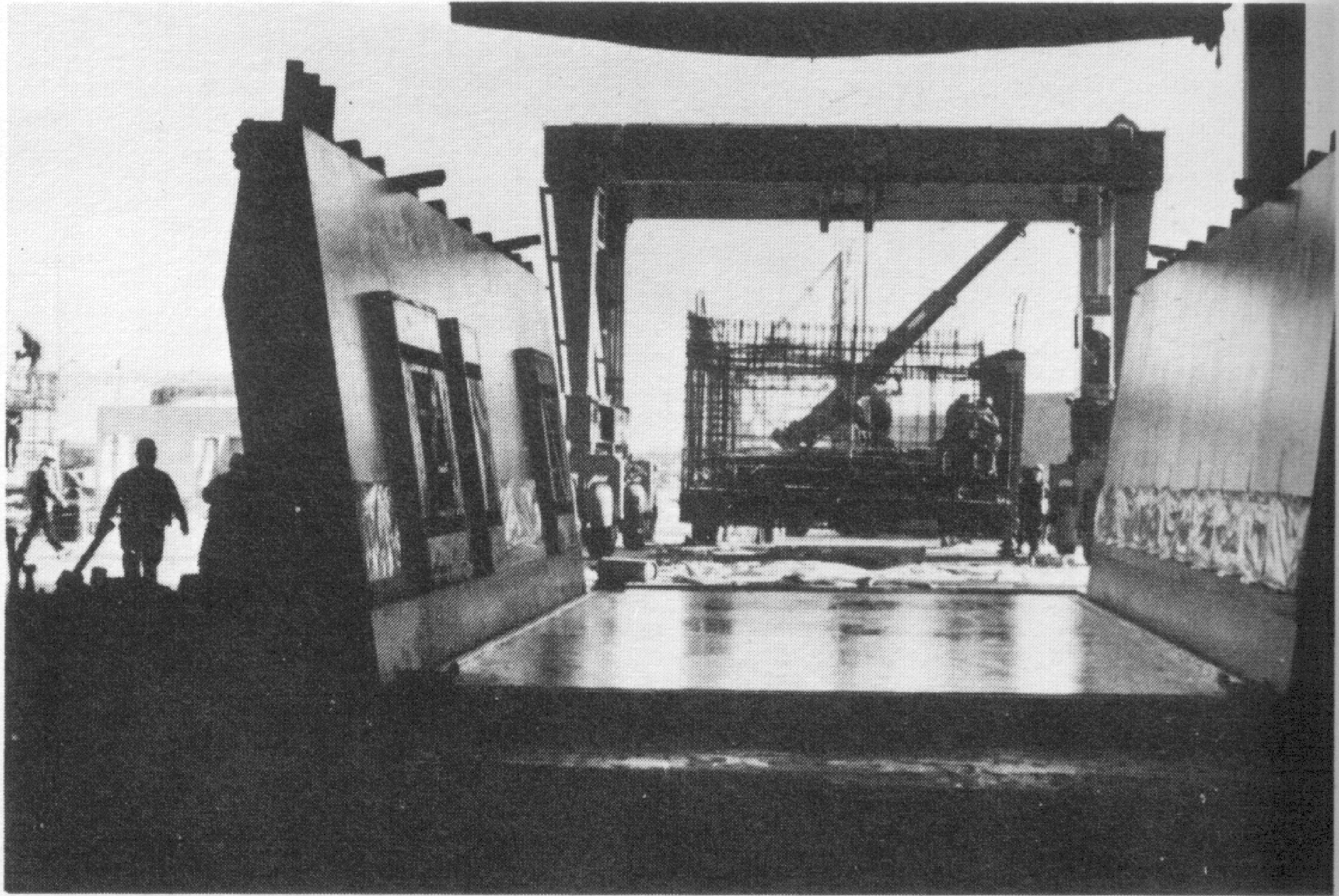


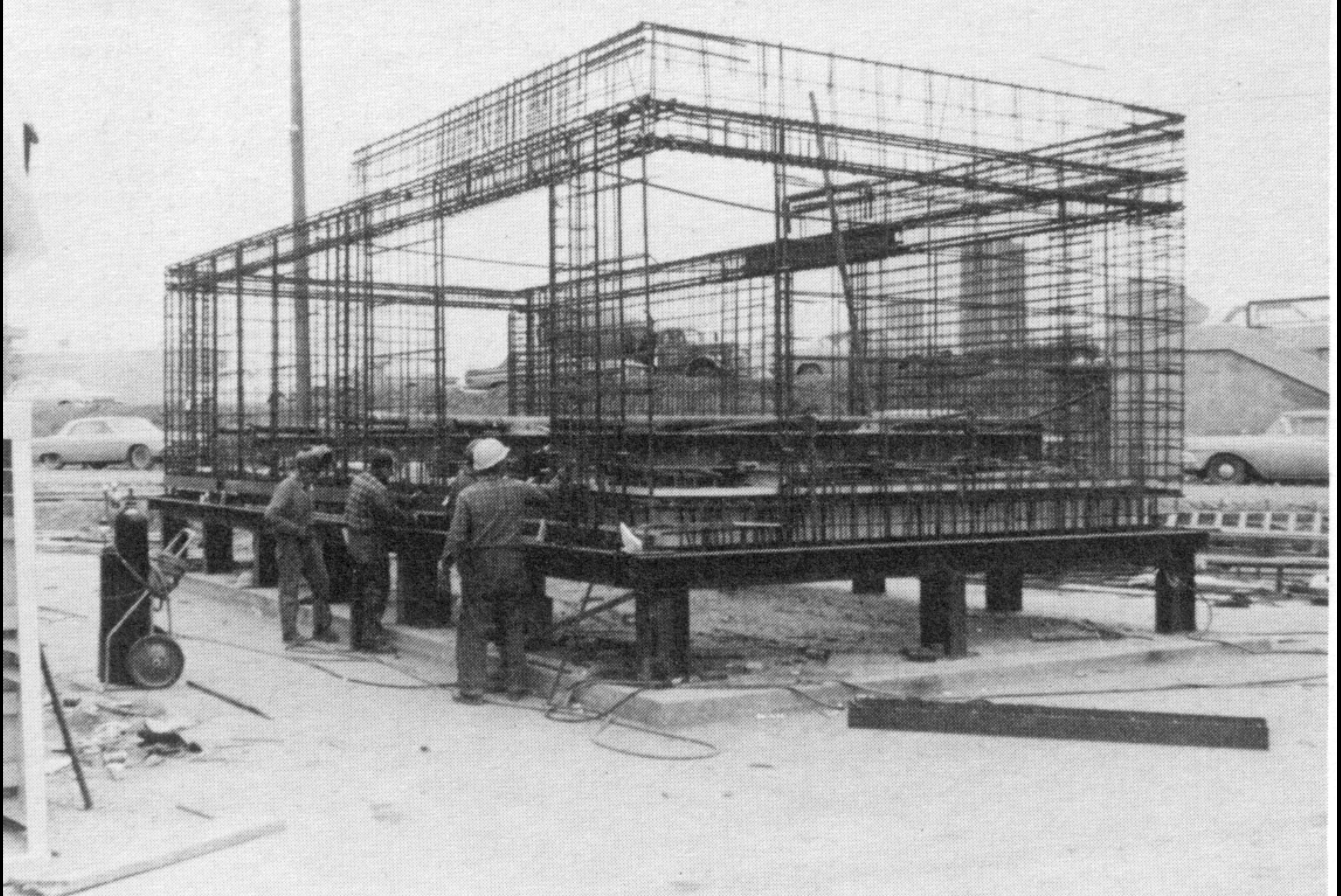
SECTION B-B
COUPE

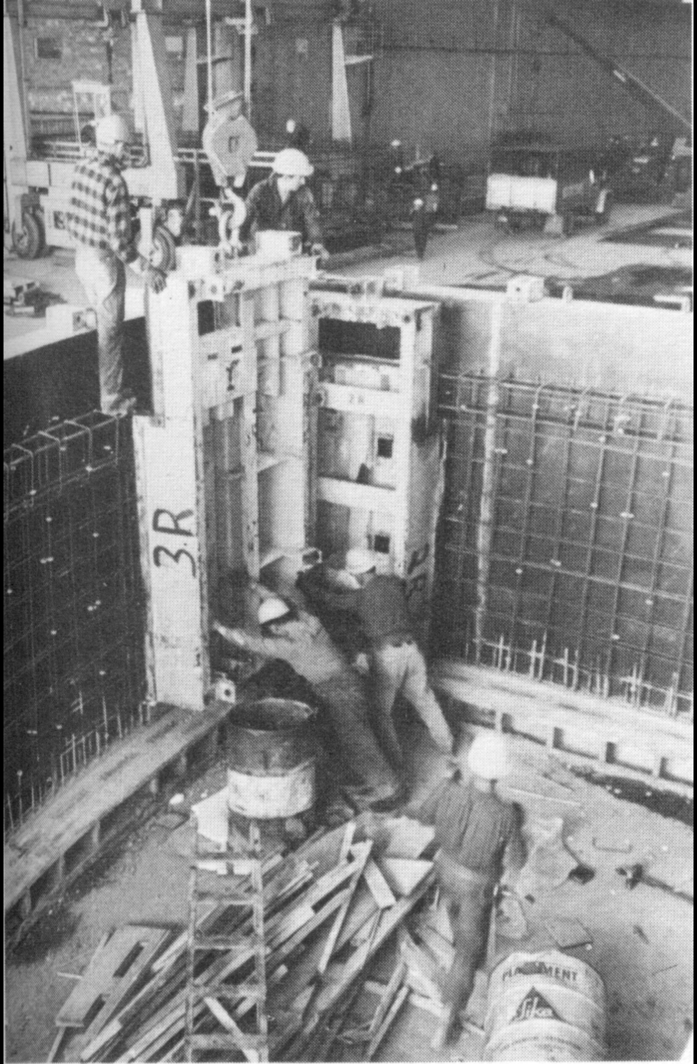


SECTION C-C
COUPE





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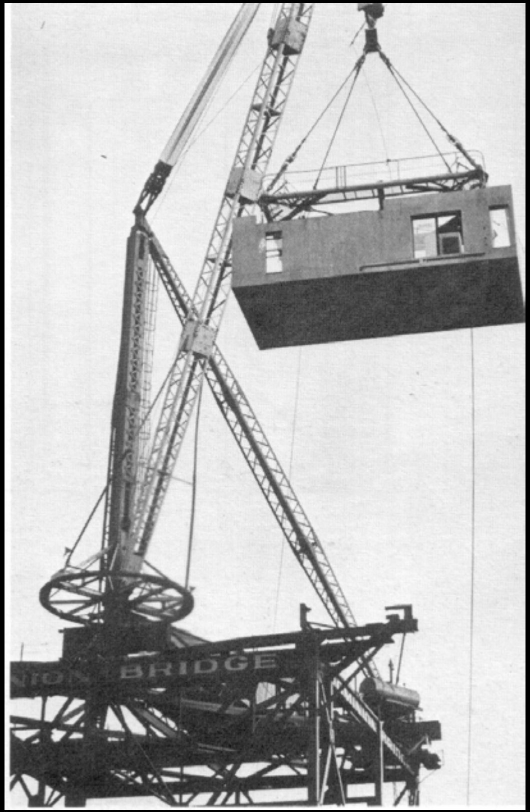
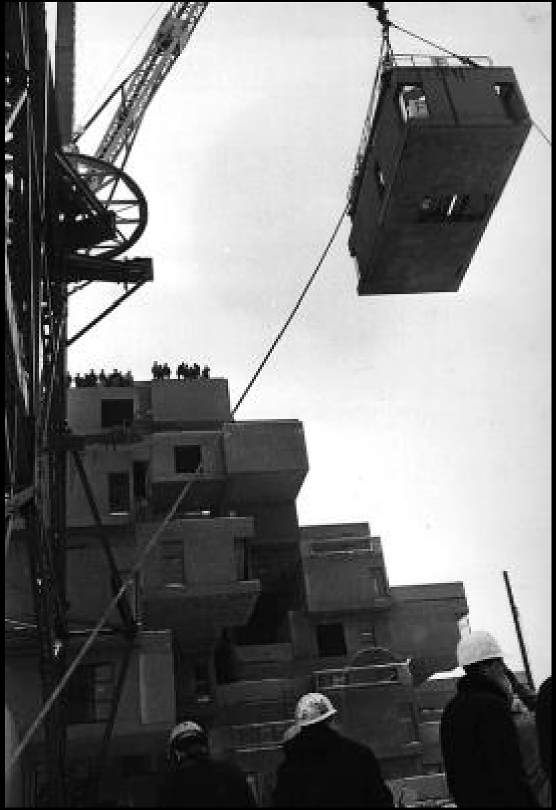
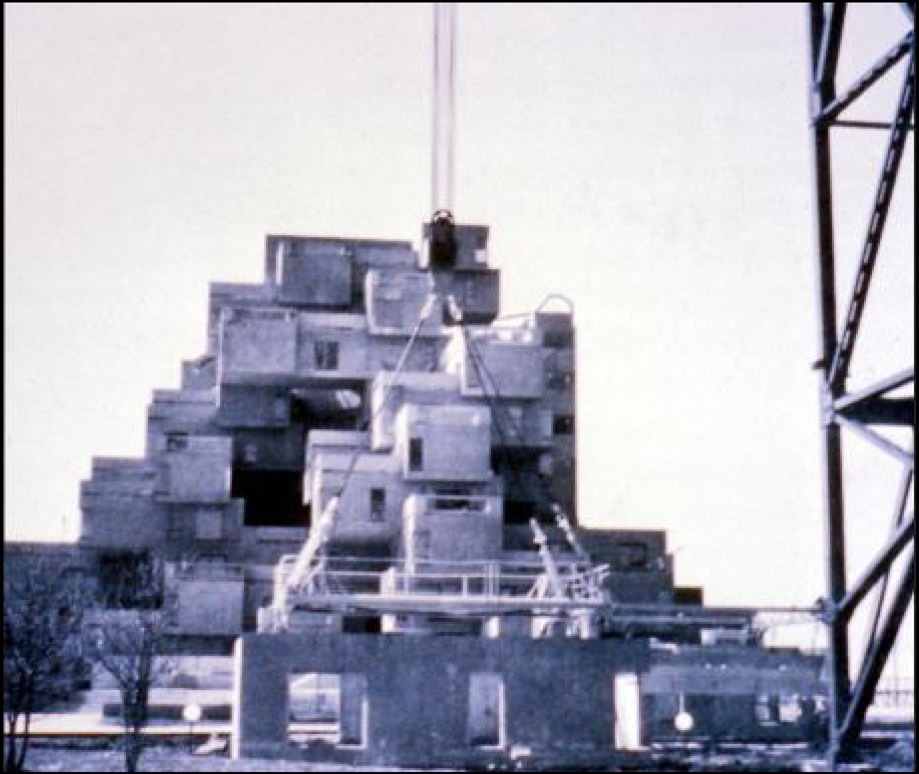
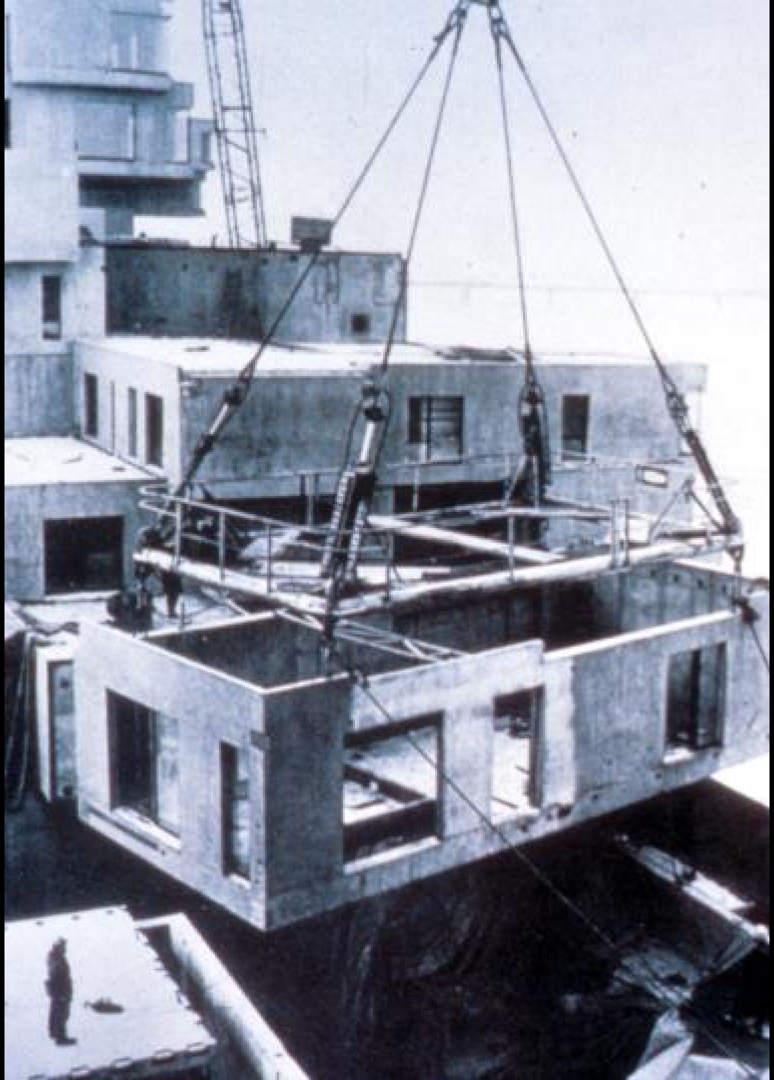
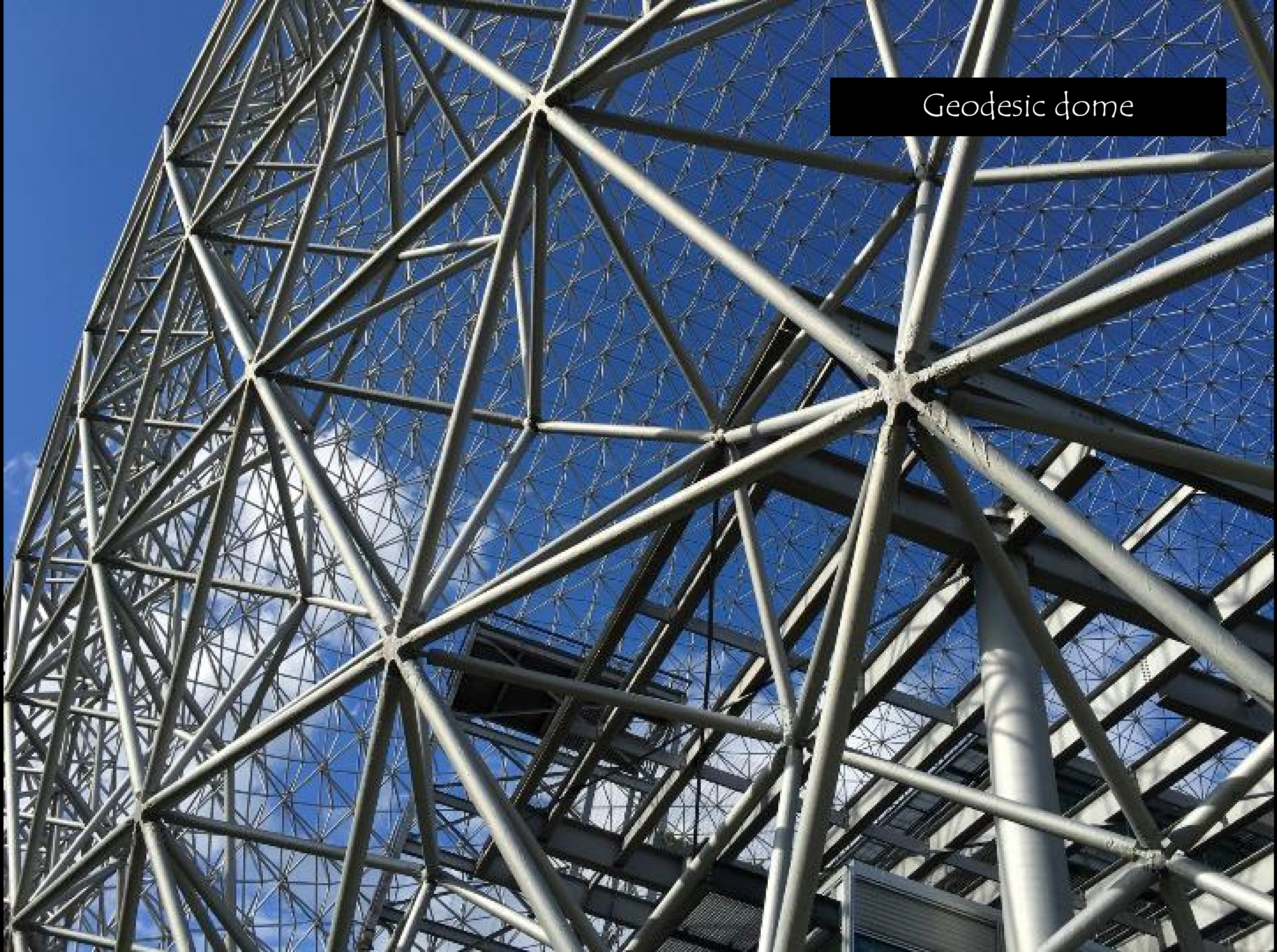

BRIDGE





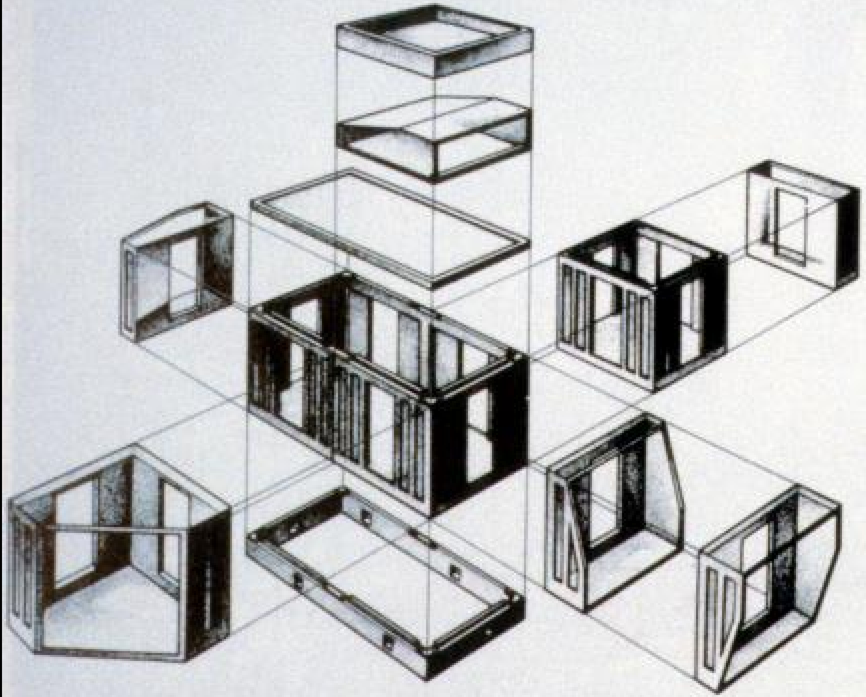


American Pavilion
Expo 1967
Montreal, Quebec
Buckminster Fuller

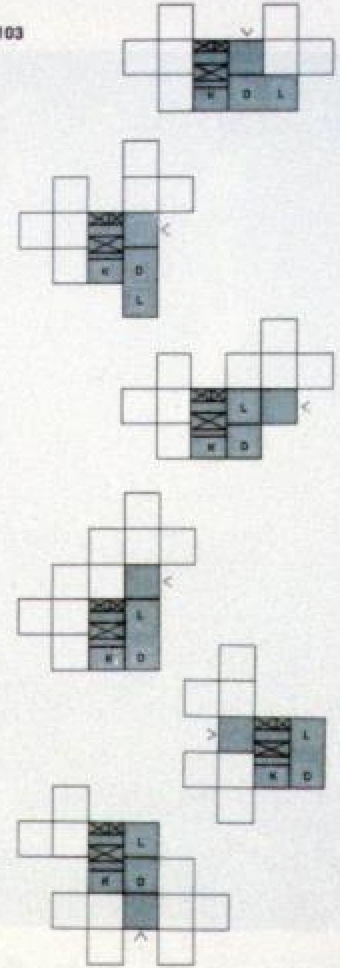

Geodesic dome

Economy is achieved through repetition of the elements and mass production

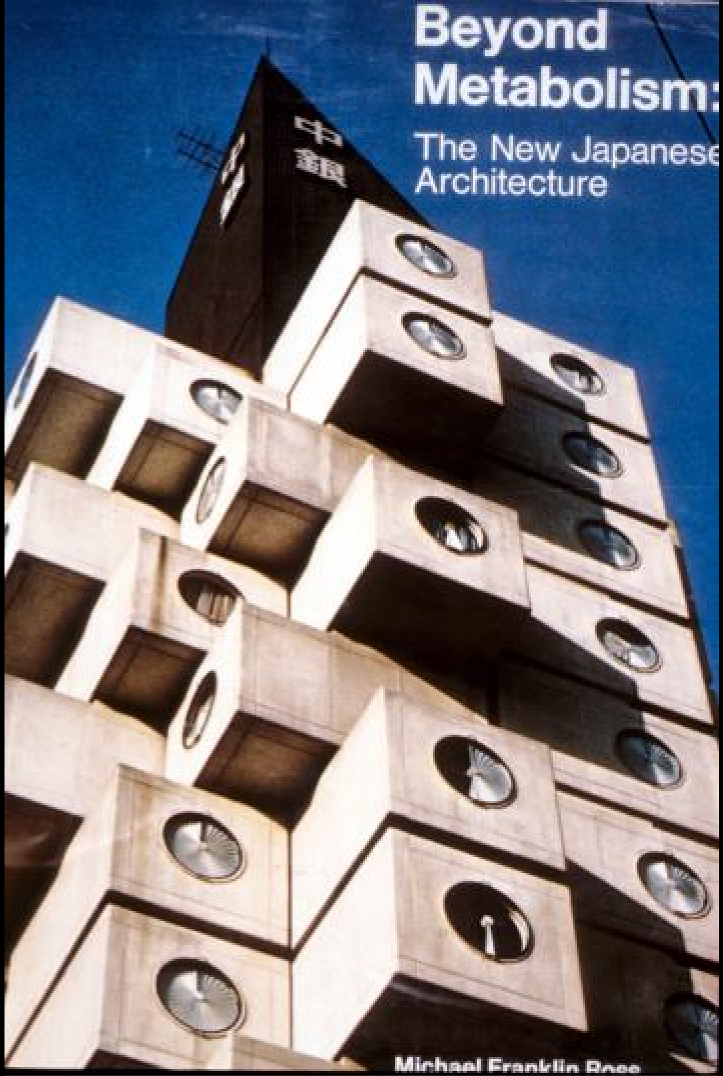
102



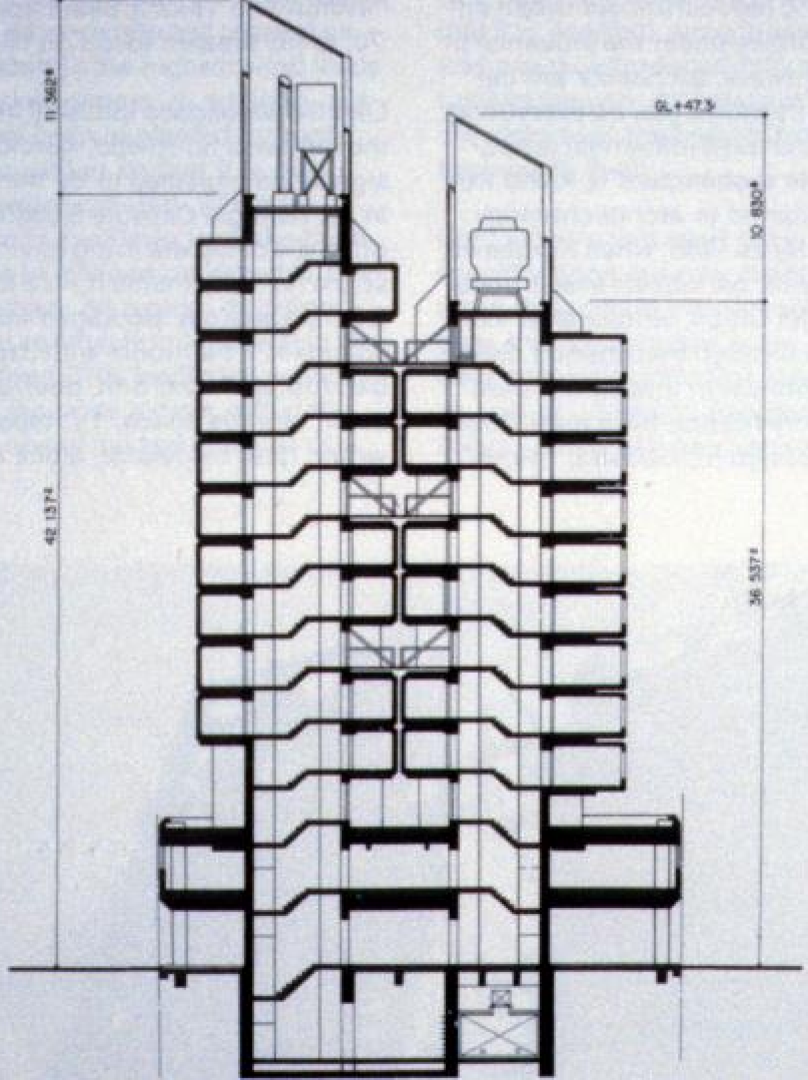
103

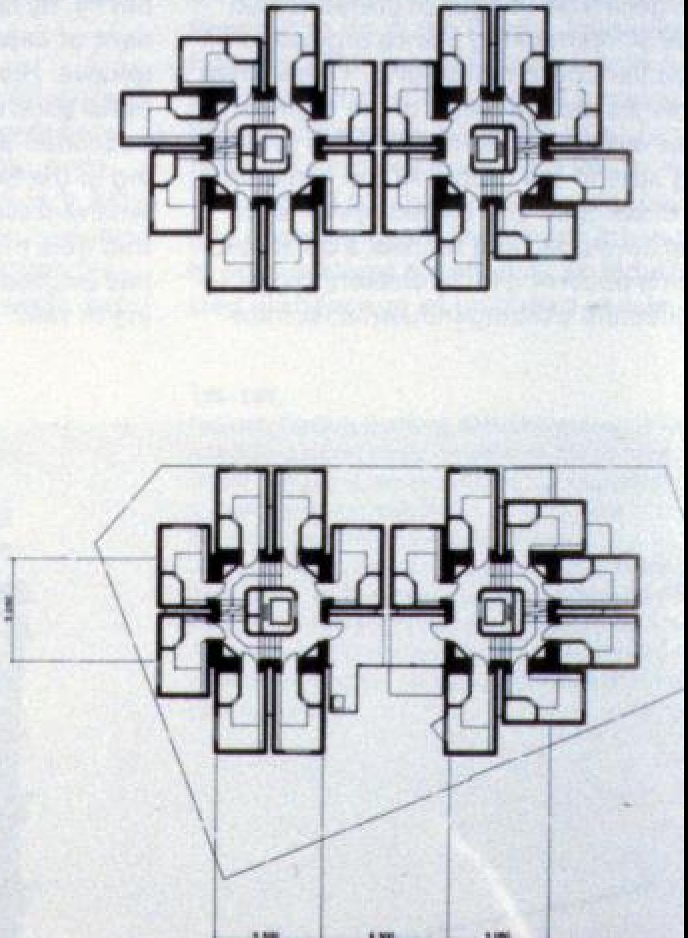


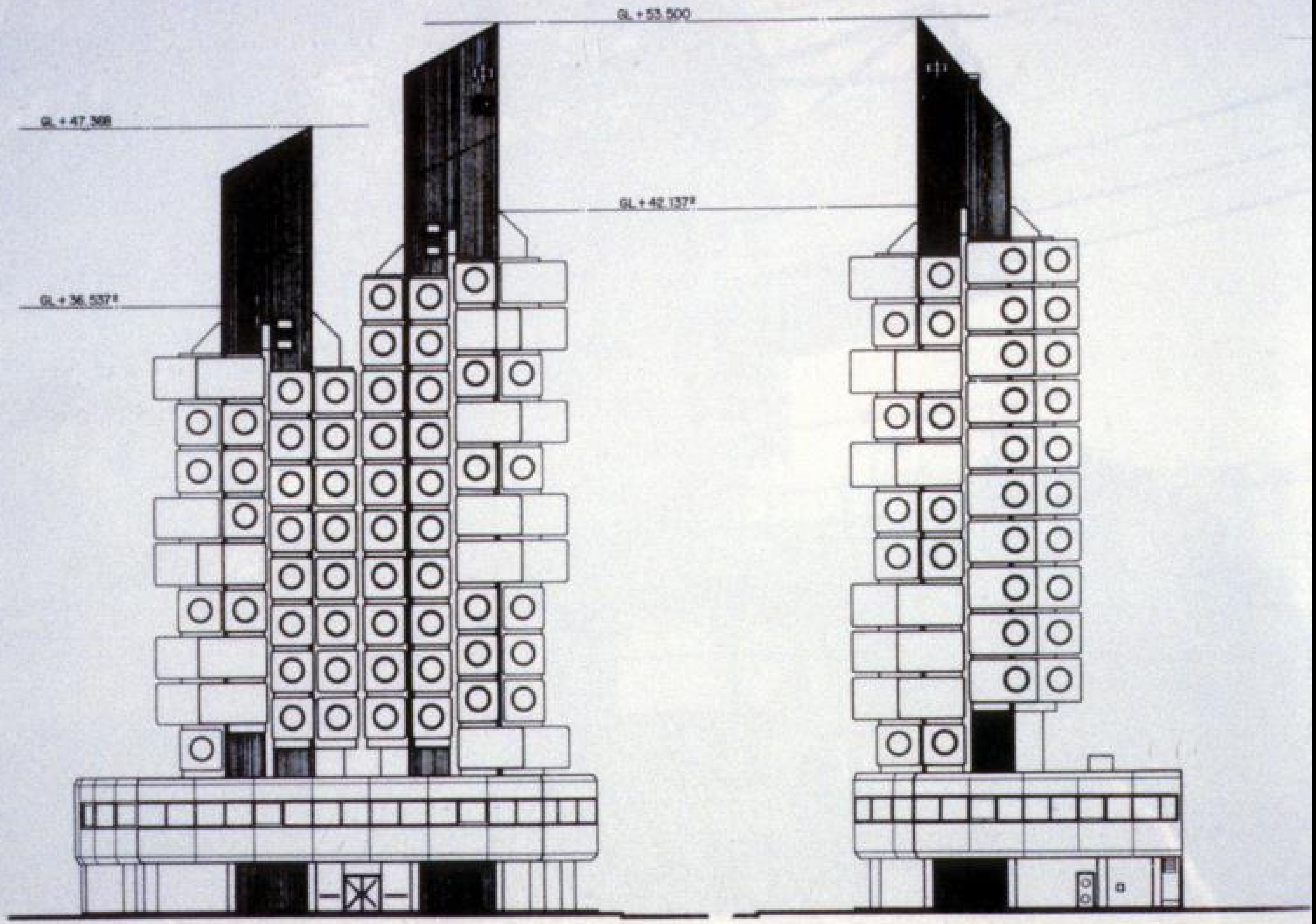
102, 103.
Taisei Overseas System, Design Prototype, Kisho Kurokawa, 1971: This closed system of prefabricated concrete elements fits together like the traditional Japanese puzzle. A variety of floor-plan clusters are available.

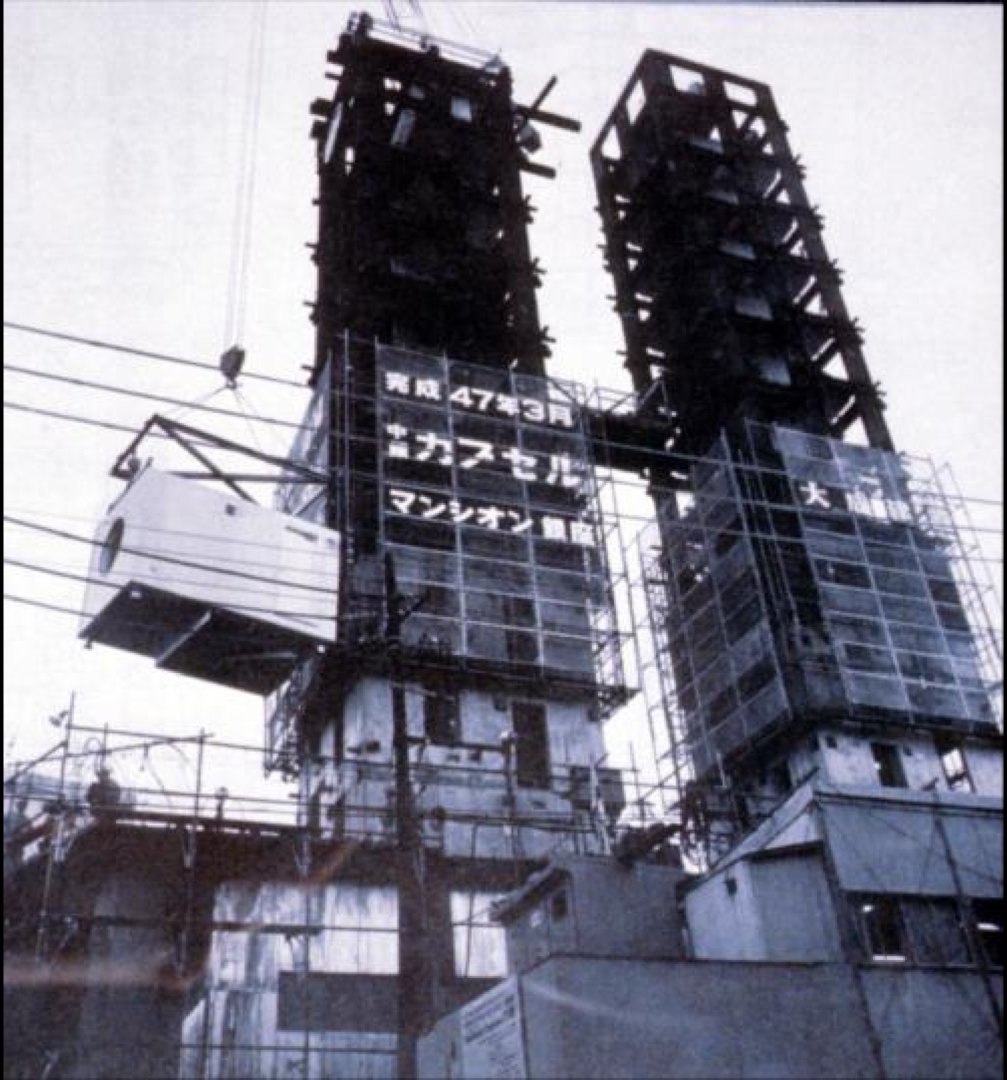


Nakagin Capsule Tower
Tokyo, Japan
Kisho Kurokawa
1972

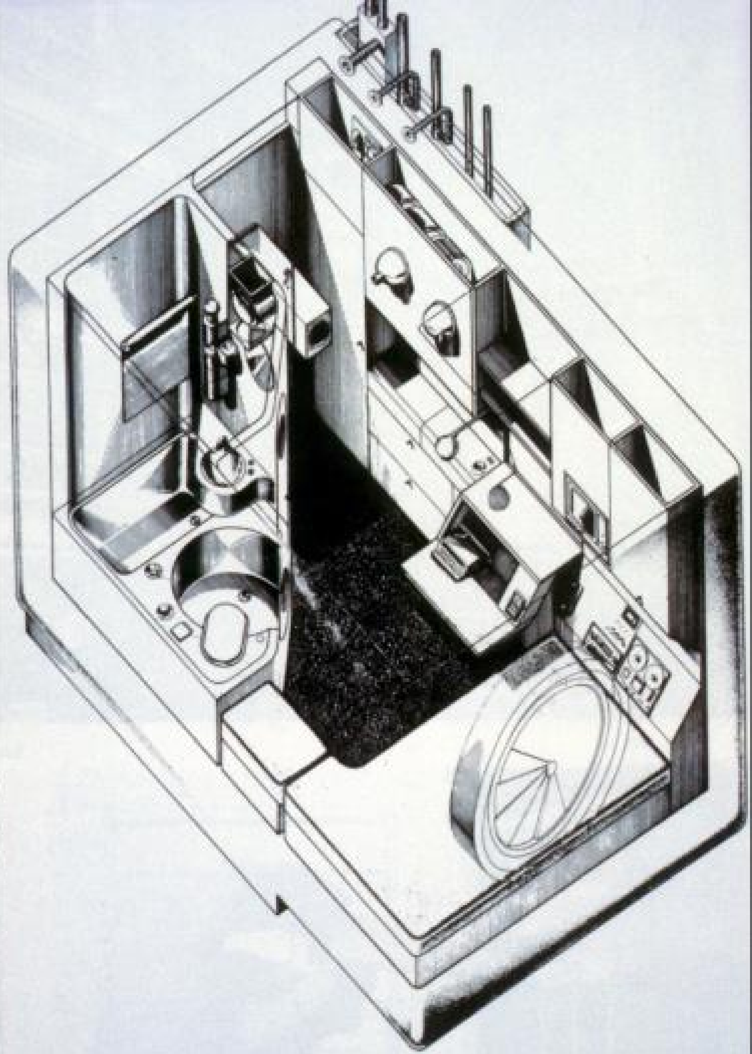

GL+47.3

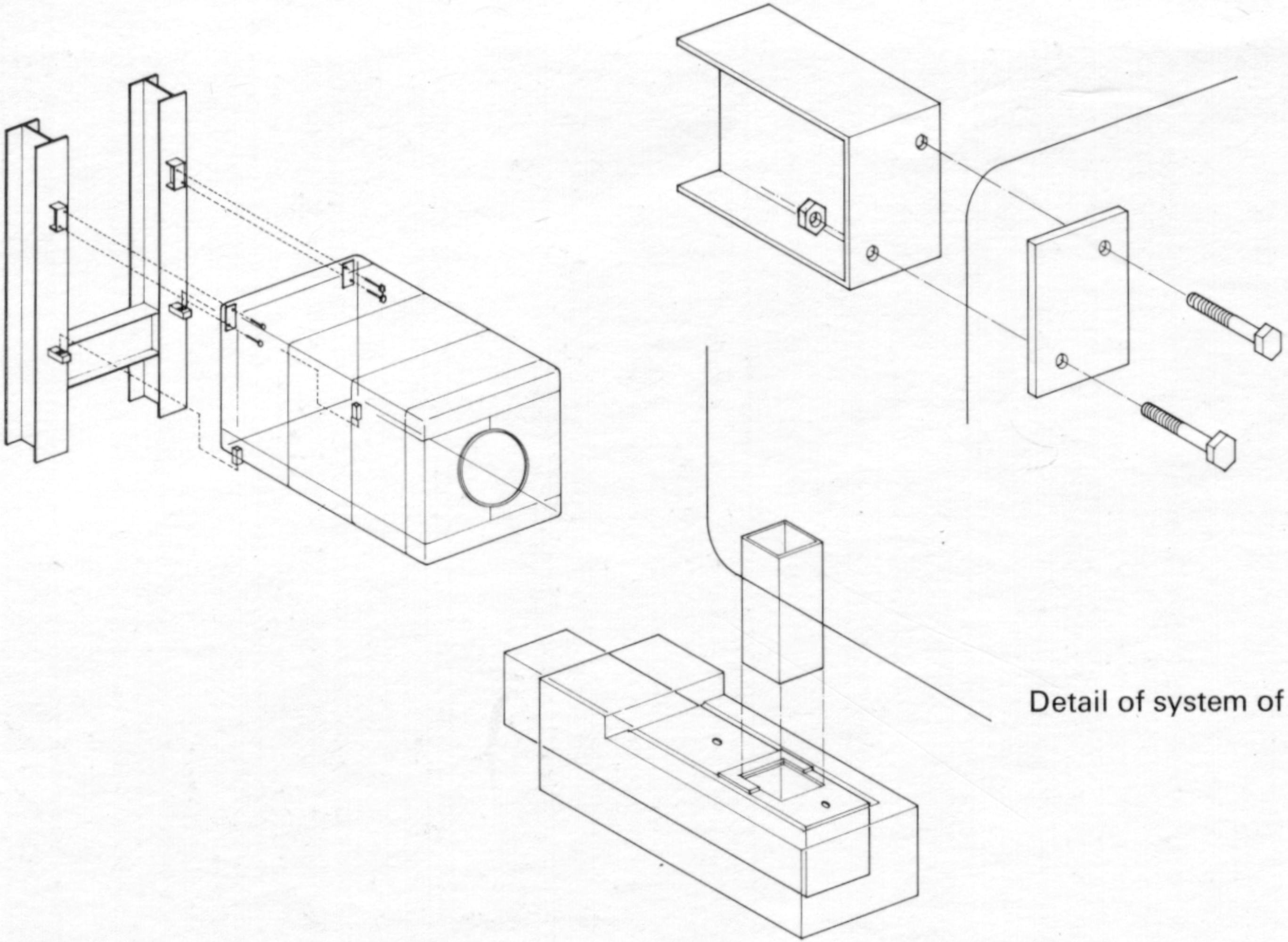



GL + 53.500
GL + 47.368
GL + 42.137
GL + 36.537



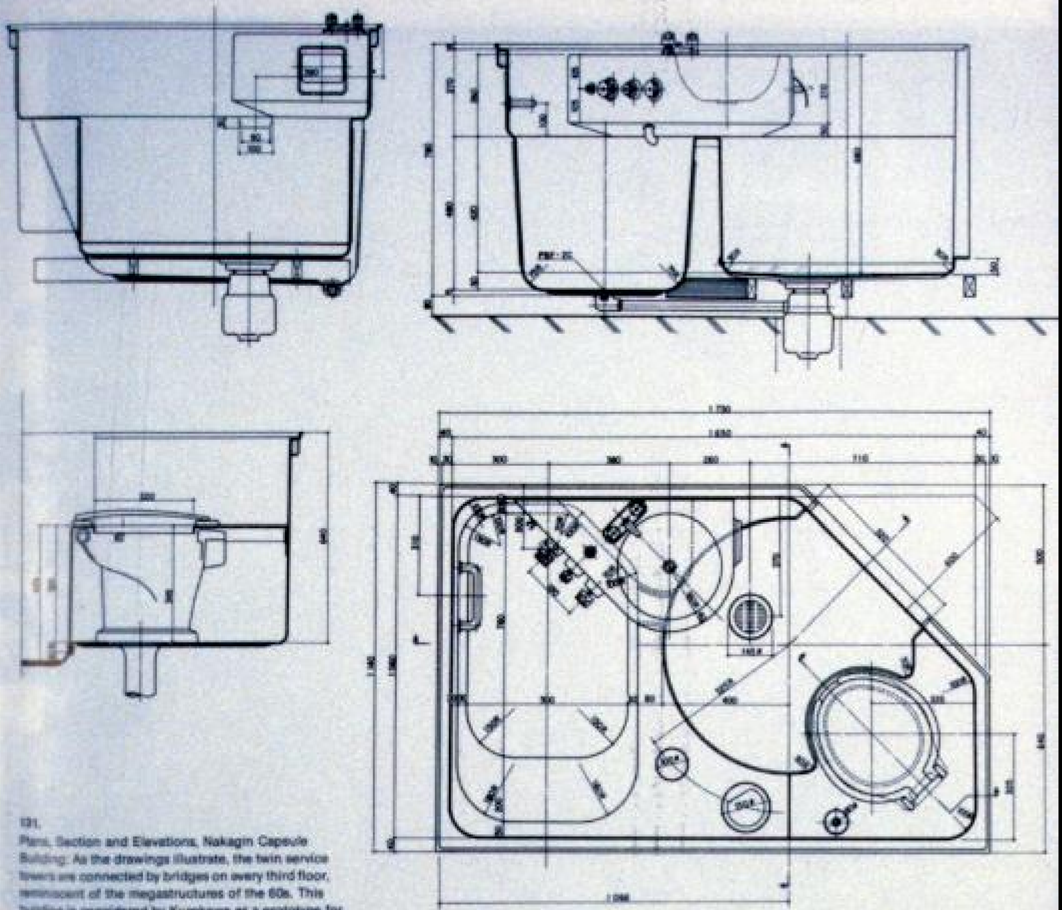
47年3月
カプセル
マンション
大



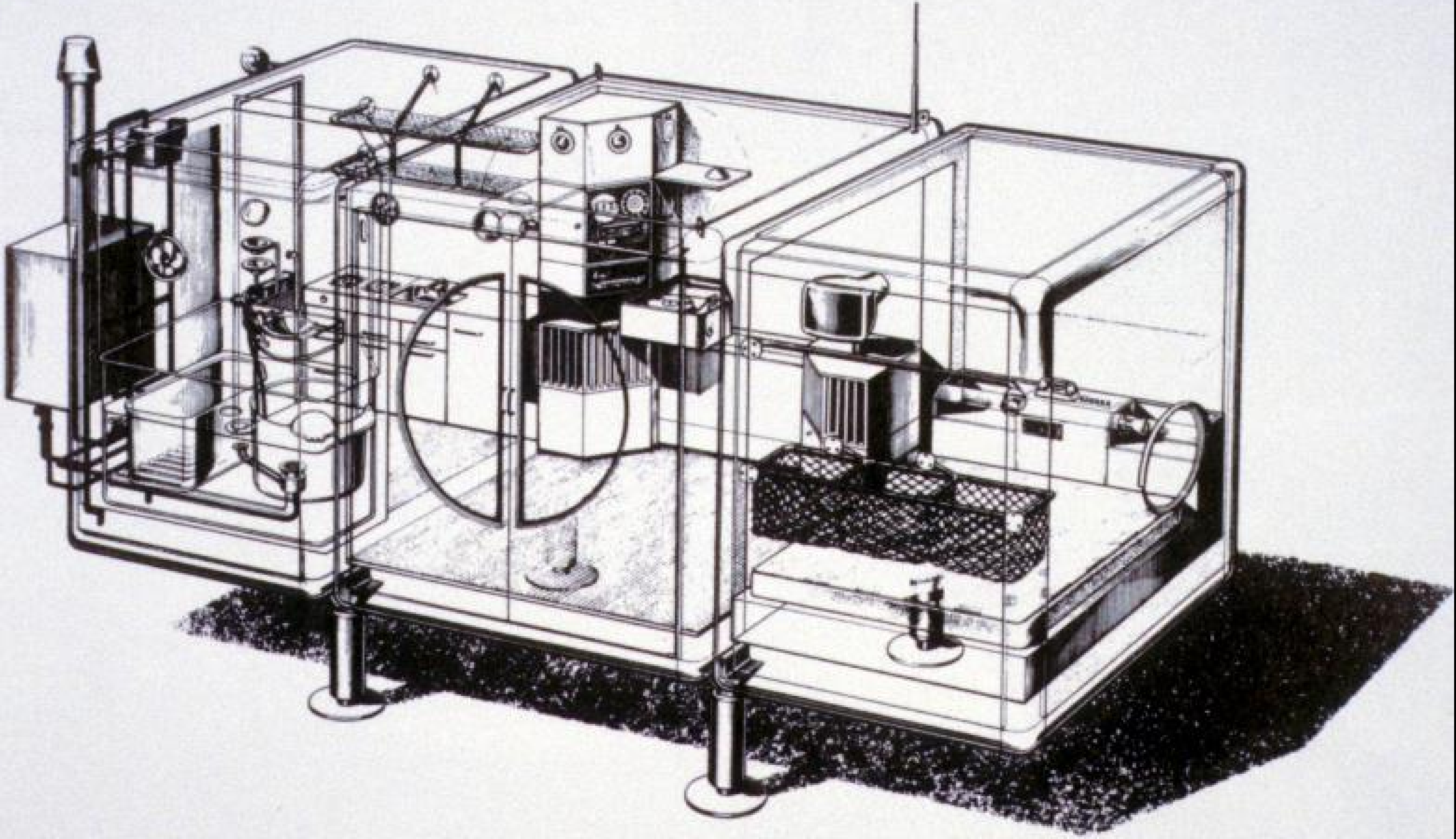


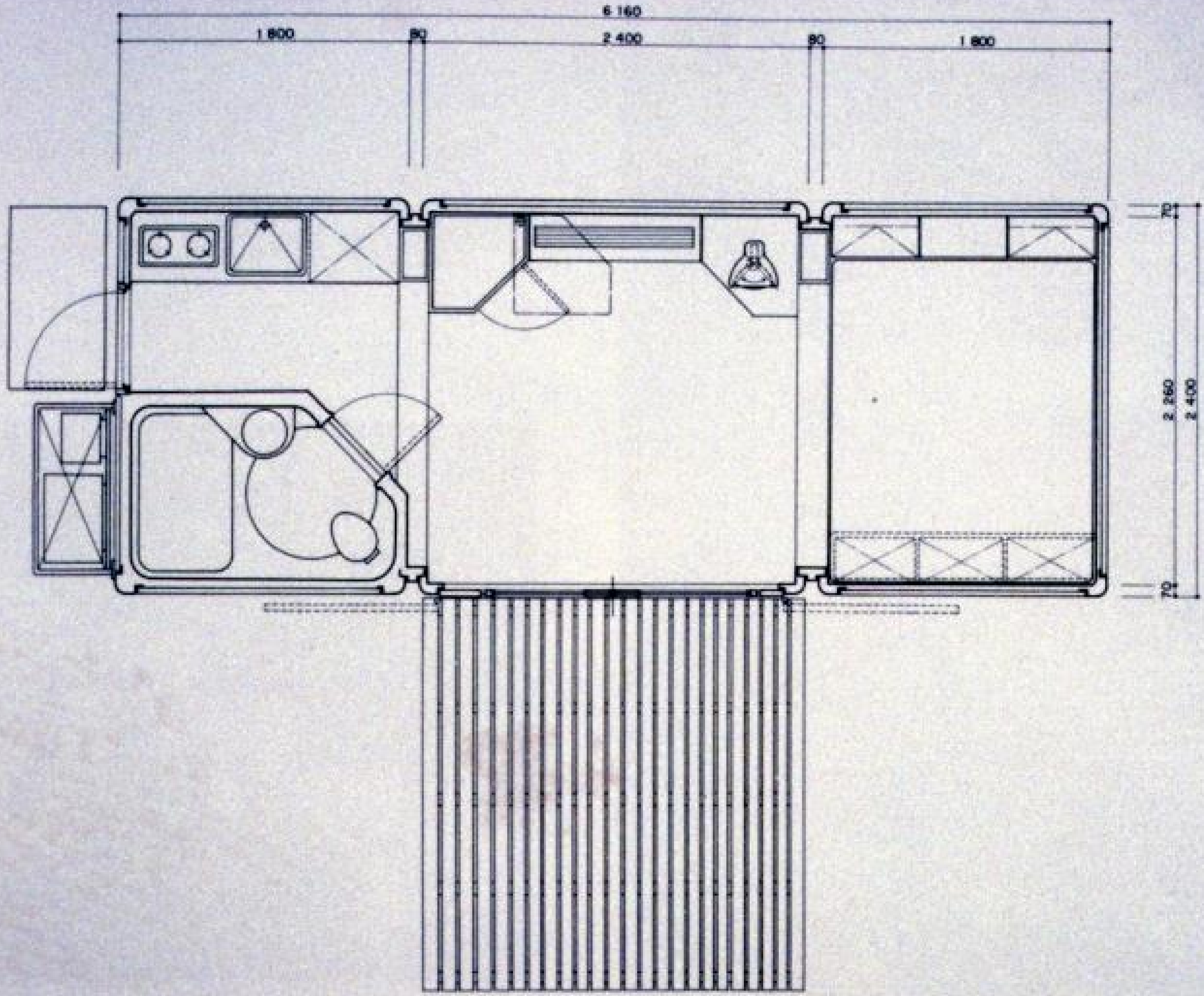
Detail of system of joining capsule to shaft

132



131.
Plans, Section and Elevations, Nakagin Capsule Building: As the drawings illustrate, the twin service towers are connected by bridges on every third floor, reminiscent of the megastructures of the 60s. This building is considered by Kurokawa as a prototype for a larger urban community.
132.
Bathroom, Nakagin Capsule: Evolved from the toilet capsules that Kurokawa created for the Celestial Theme Pavilion at Expo '70, this piece of industrial design is in itself a modern-day Japanese puzzle, integrating all sanitary functions into 21 sq ft (2m²).



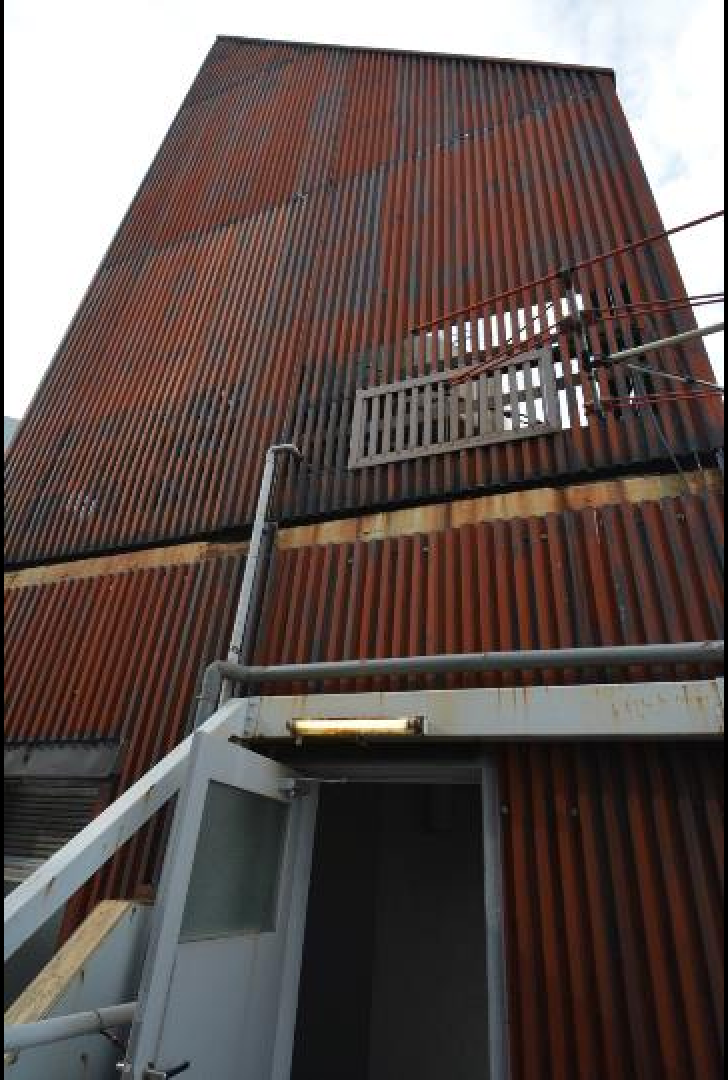


6 160
1 800
80
2 400
80
1 800
70
2 260
2 400
70


中銀


タワーヒル
SERVICE STAND
No Trespassing


中銀
中銀

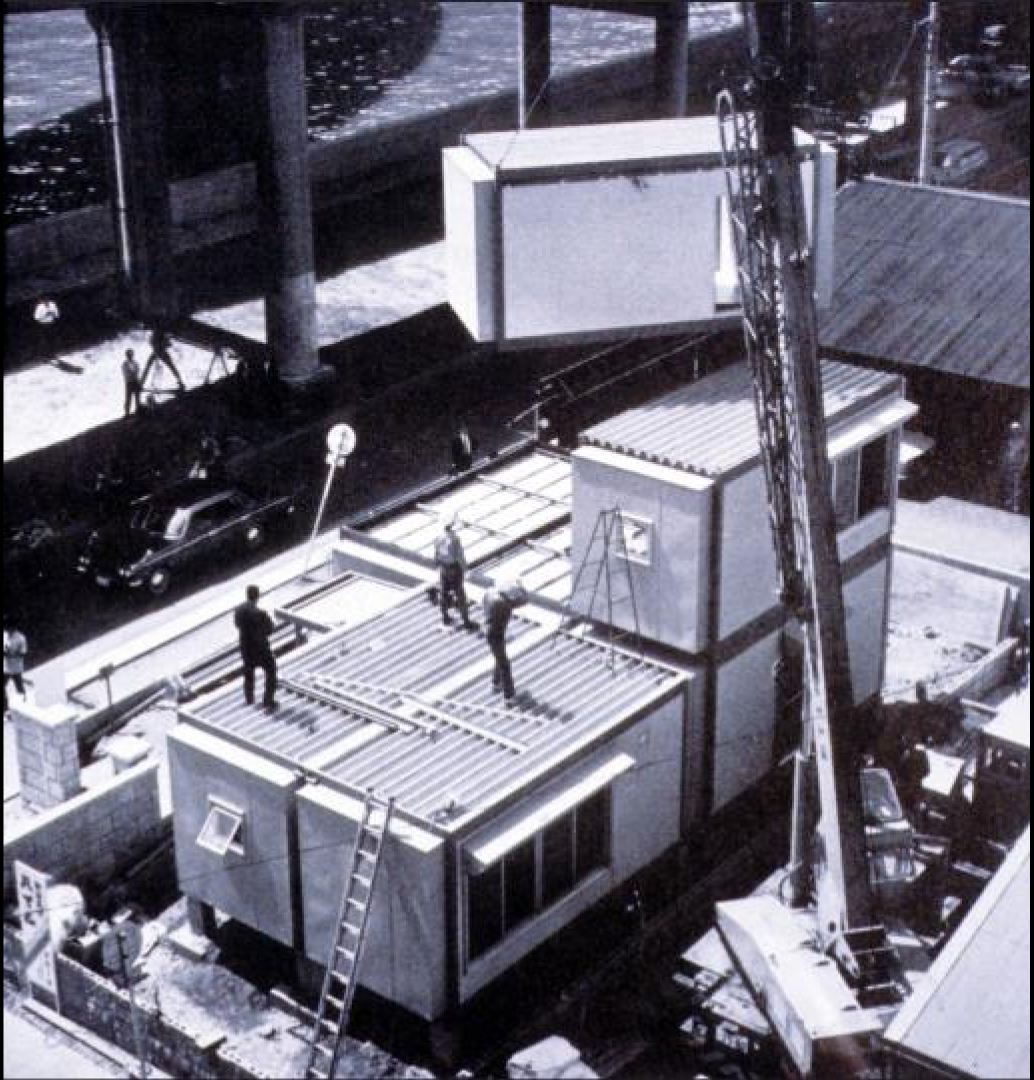



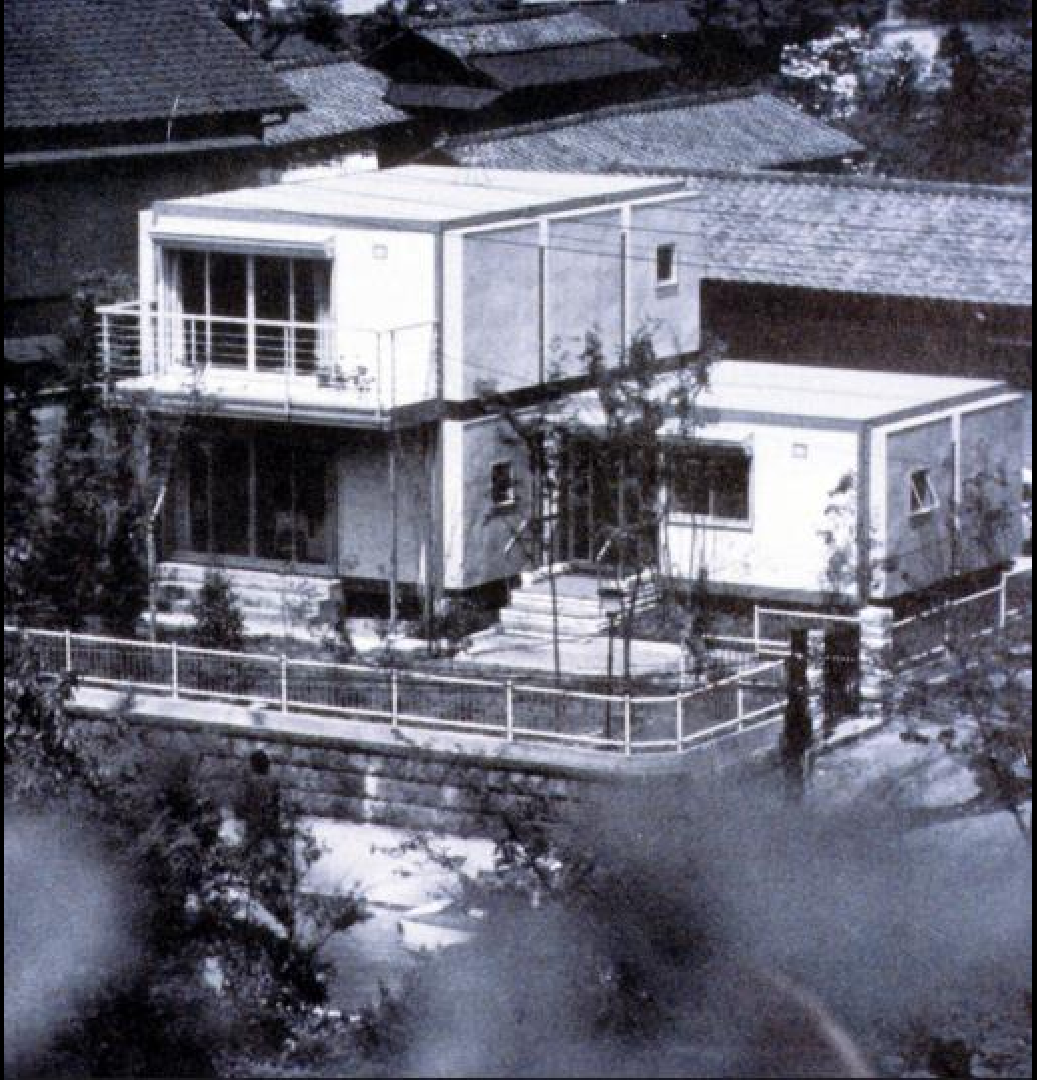


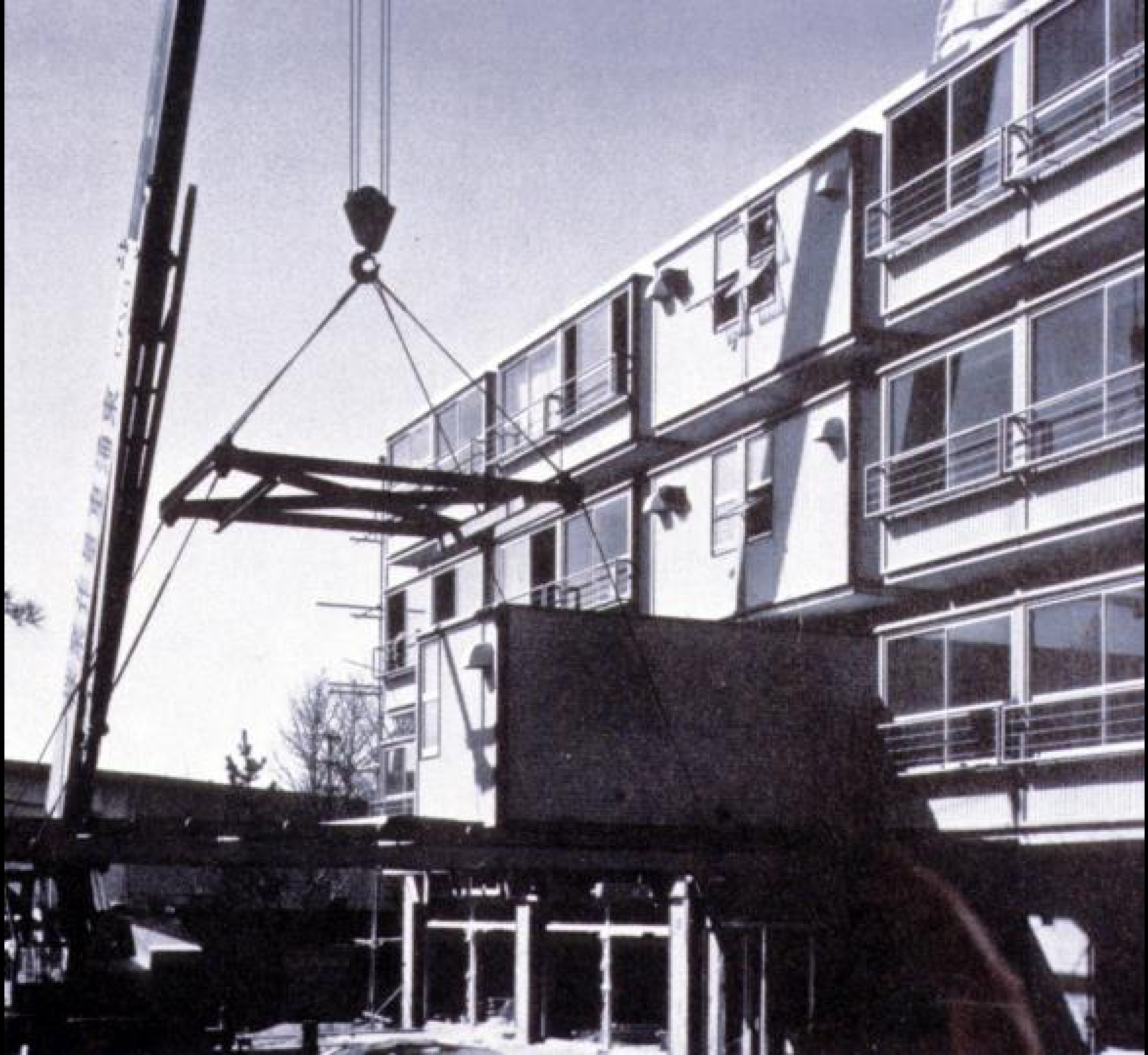
Hello



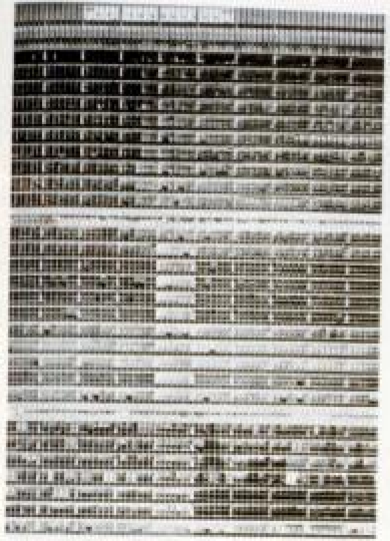
nakagin
capsule tower
WIFI
TIGHTEN THE FAUCET
IT LEAKS
Greetings from Melbourne, AUS!
LONG LIFE TO METABOLISM ARCHITECTURE
Gracias!!
Enjoy 東京!
There's a public bath (Sento) nearby.
#faircompanies
IF YOU NEED ANYTHING, CALL
MASATO ABE: 080 9575 5192







816, 817 *Two types of American prefabricated houses: the 'colonial cottage' produced by the American Houses Inc. at $7,500 and the 'Catalina' house produced by the U.S. Steel Houses Inc. at $11,500*

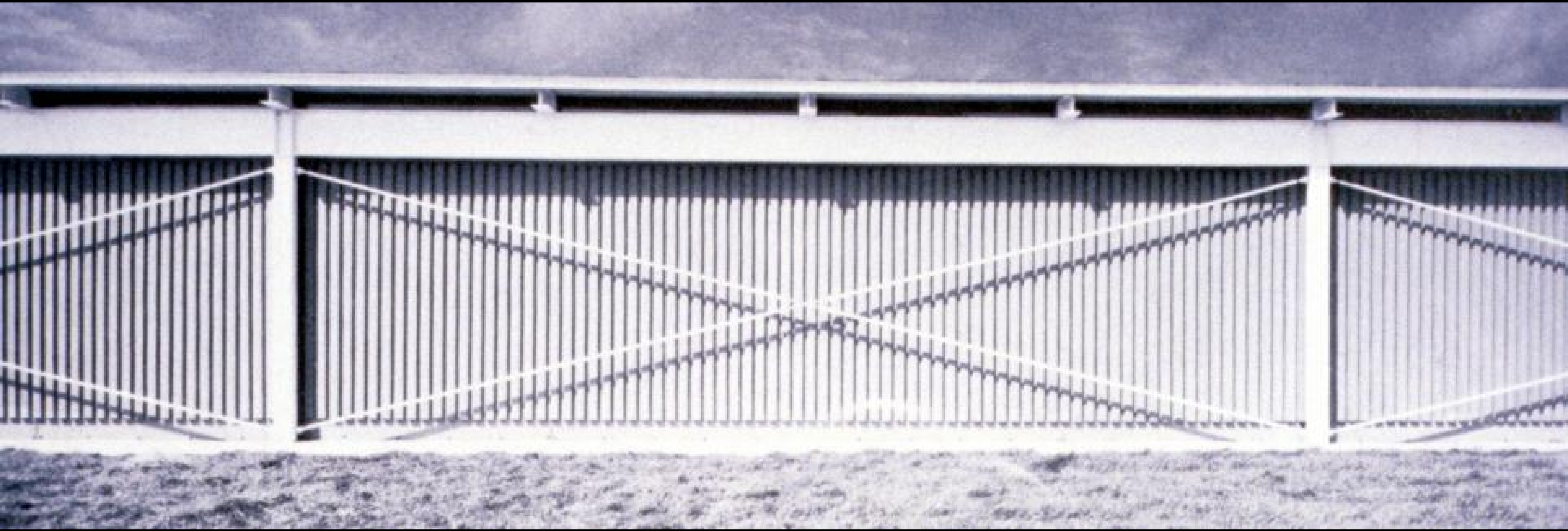


'Very good—14 hours flat—but they're all upside down!'

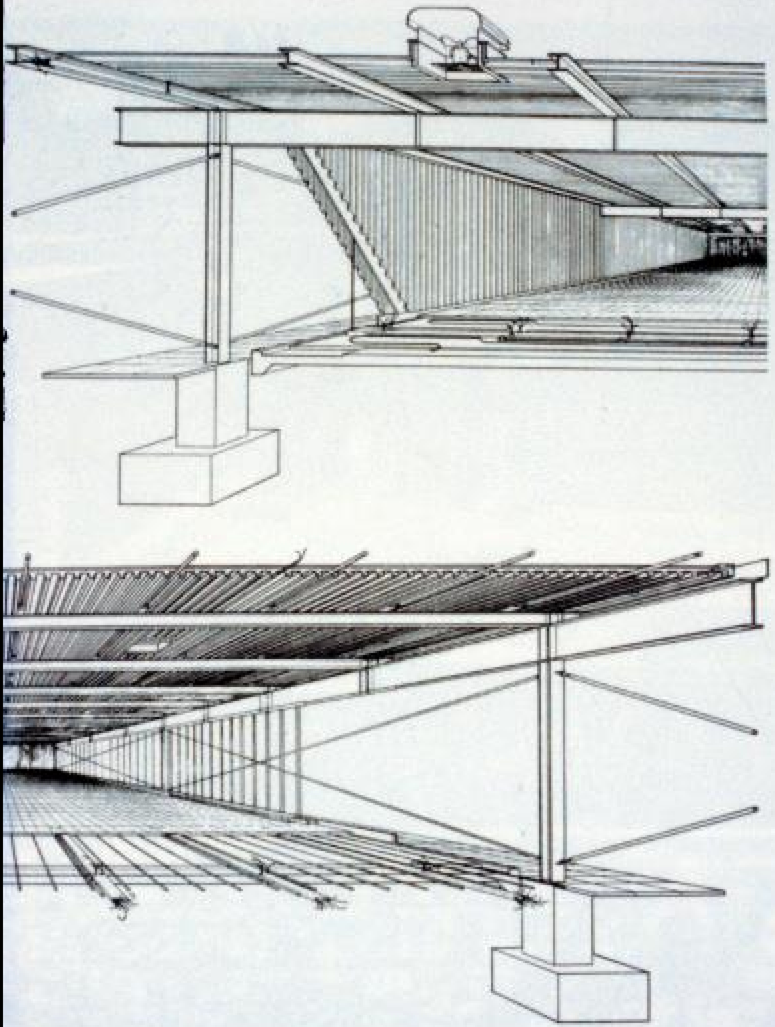
845 (above, left) New York, One of the façades of the U.N. building
846 (below, left) Cartoon from the Architectural Record, April 1955
847 (right) Pittsburgh, A.L.C.O.A. building (Harrison and Abramowitz, 1952)

The High Tech Movement


HIGH-TECH?
TECH-BLINDS!
TECHNICAL BLINDS LTD.
Innovators of solar shading systems
Wooburn Town, High Wycombe, Bucks. (06285) 243
Renault Centre, Swindon.
Architects: Foster Associates.



Reliance Controls
Swindon, UK
Team 4 (Wendy and Norman Foster + Richard and Sue Rogers)
1967



12 Team 4, Reliance Controls Factory, Swindon, 1966

Characterized by components that express their forces

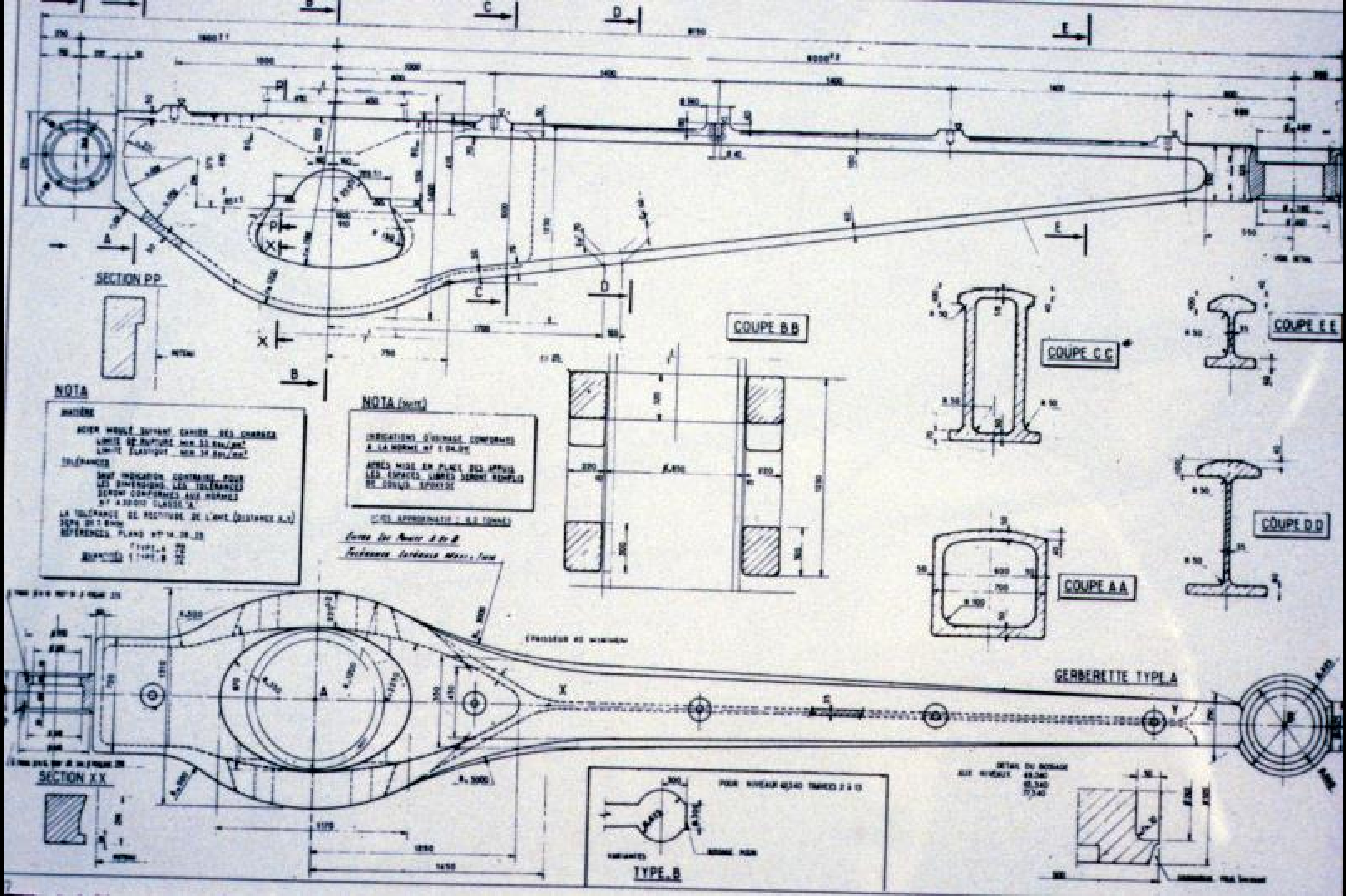
–

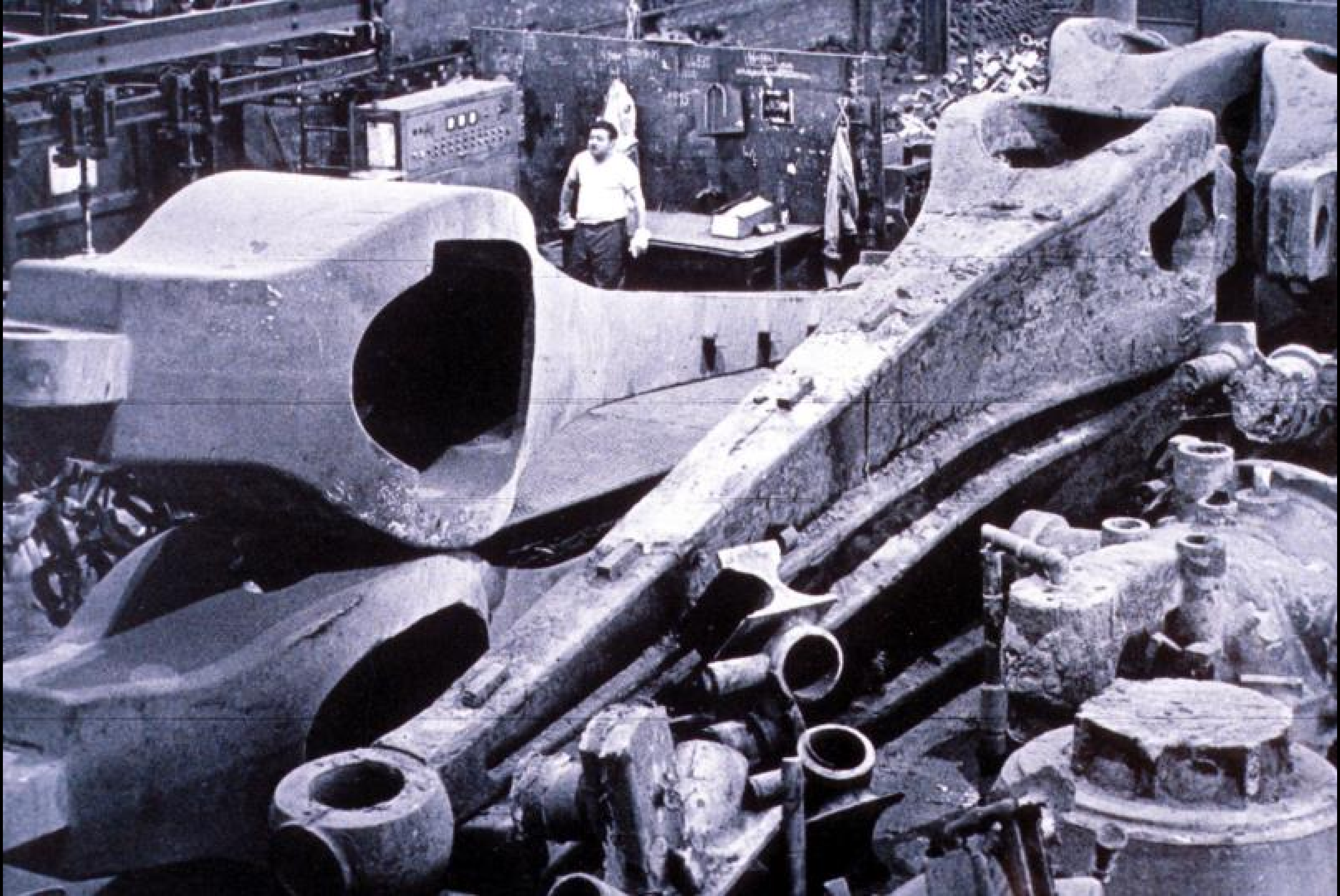
Tension vs. Compression

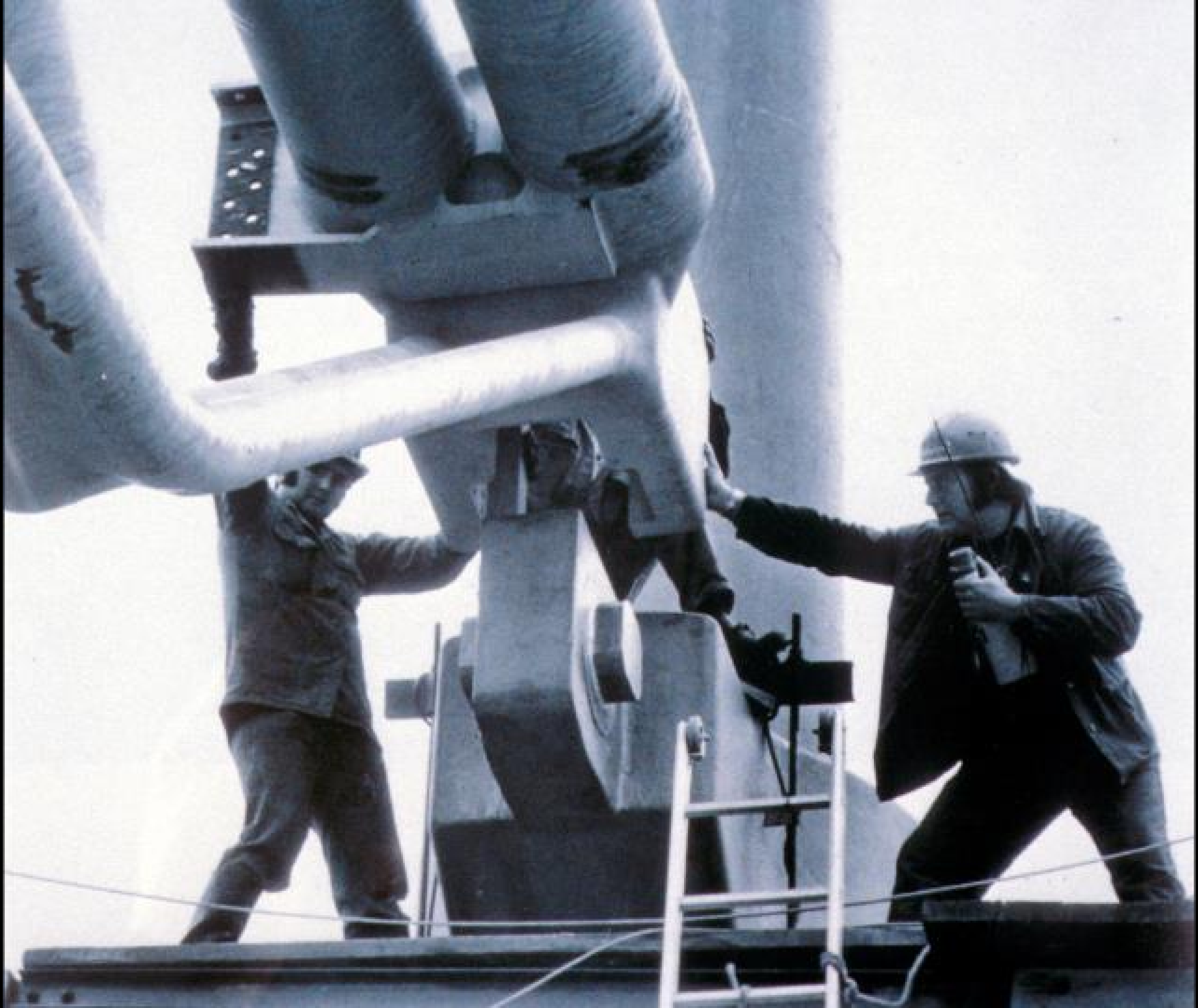
–

Skinny vs. Fat

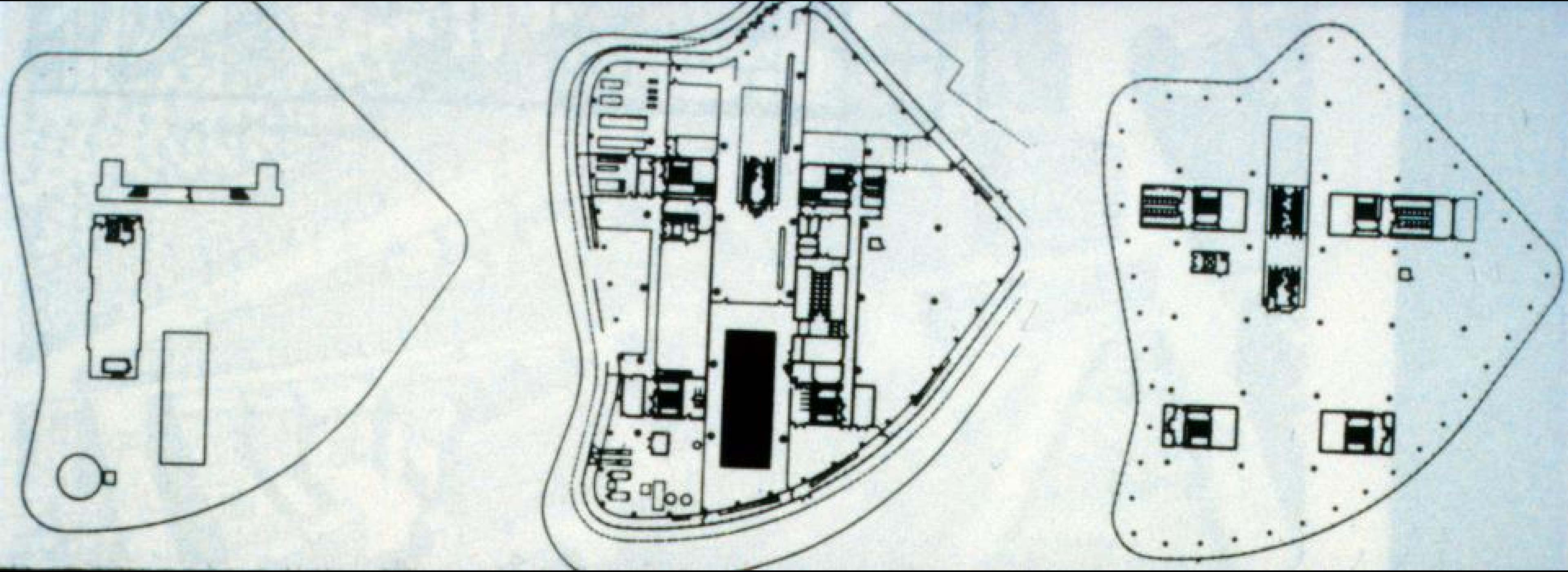
Pompidou Centre
Paris, France
Piano and Rogers
1977

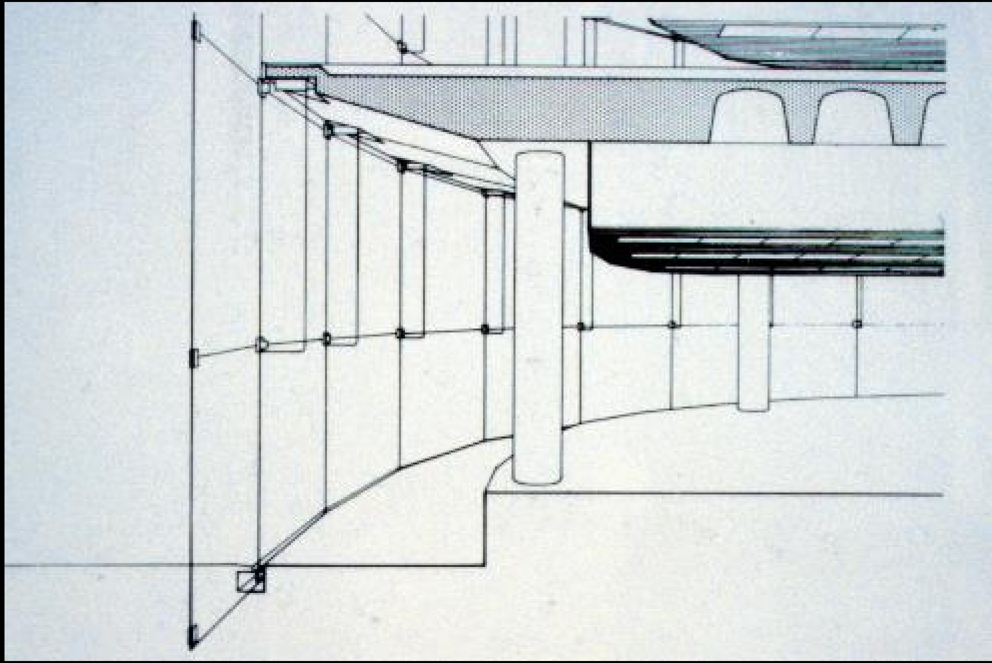

SECTION PP
NOTA
NOTA (suite)
COUPE B.B
COUPE C.C
COUPE E.E
COUPE D.D
COUPE A.A
GERBERETTE TYPE A
SECTION XX
TYPE B

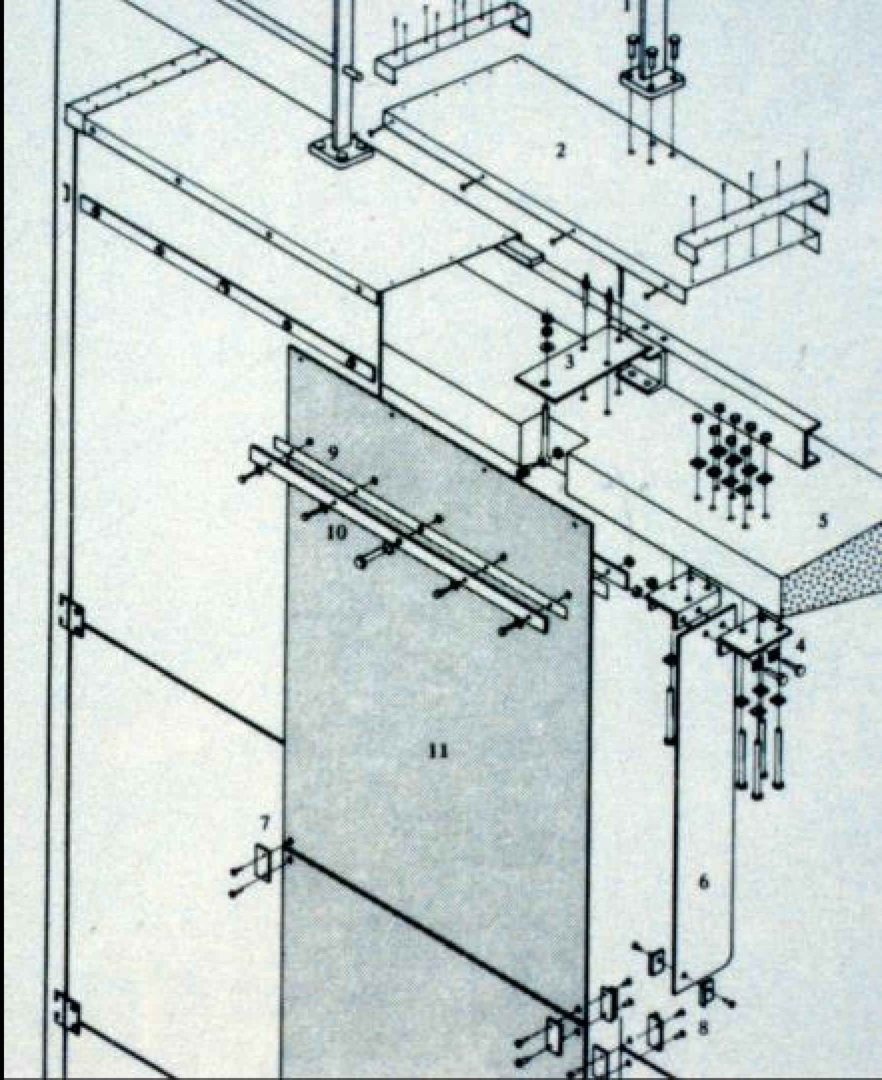




Willis Building (Willis Faber Dumas)
Ipswich, England
Norman Foster and Michael Hopkins
1975



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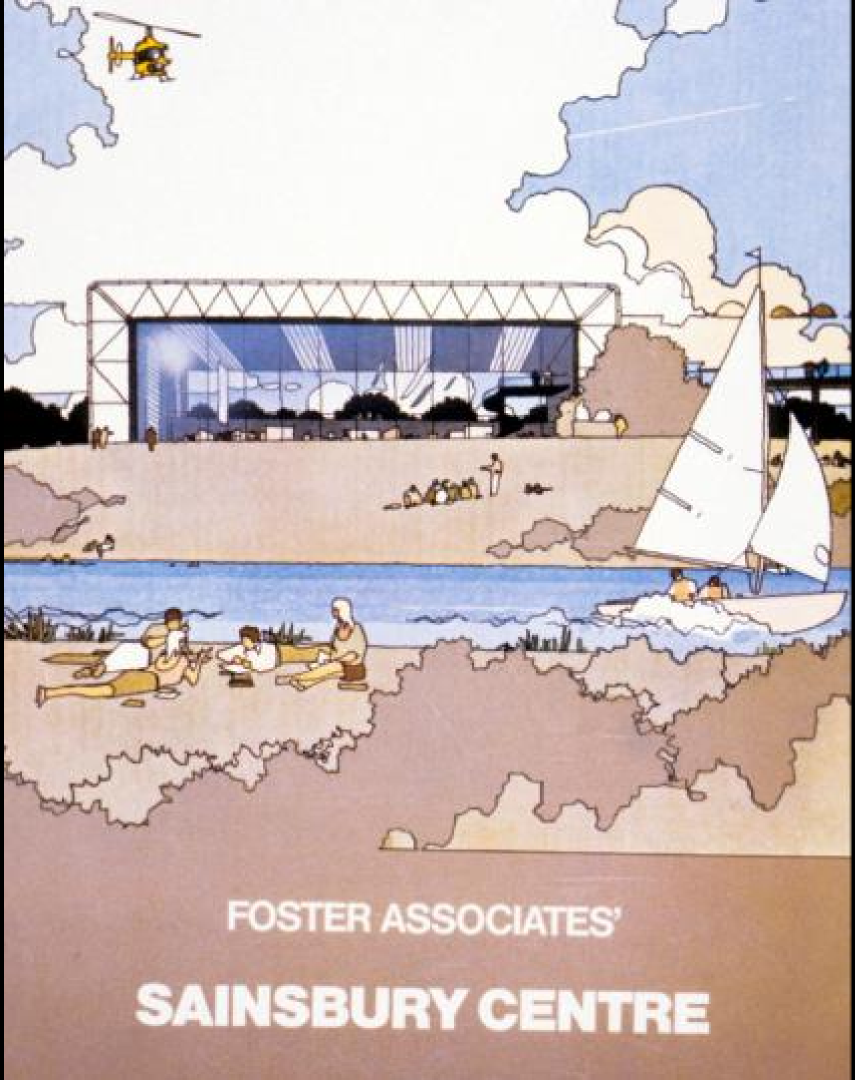
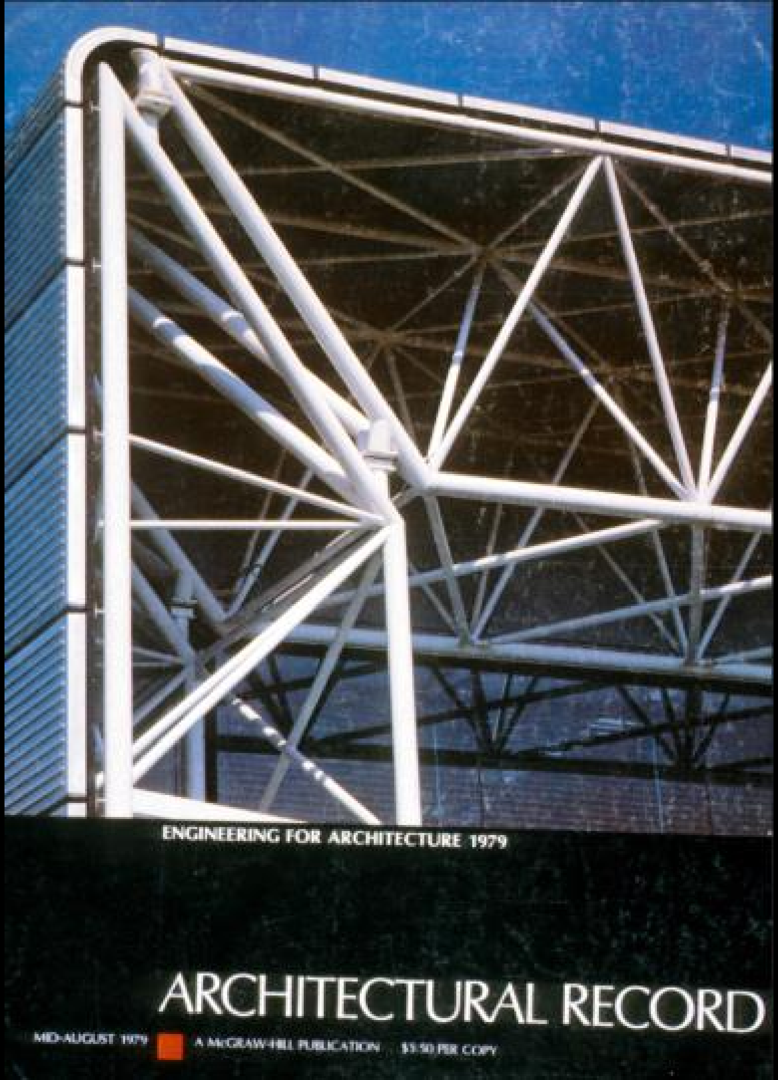
Sainsbury Centre for the Arts
England
Foster and Partners
1977


FOSTER ASSOCIATES'
SAINSBURY CENTRE


ENGINEERING FOR ARCHITECTURE 1979
ARCHITECTURAL RECORD
MID-AUGUST 1979
A McGRAW-HILL PUBLICATION
$3.50 PER COPY

Internally the services are disguised and the servicing is sensed rather than visible – magically responding to changing light le

THE BUILDING AS SERVICING ECHANISM CHNOLOGY)

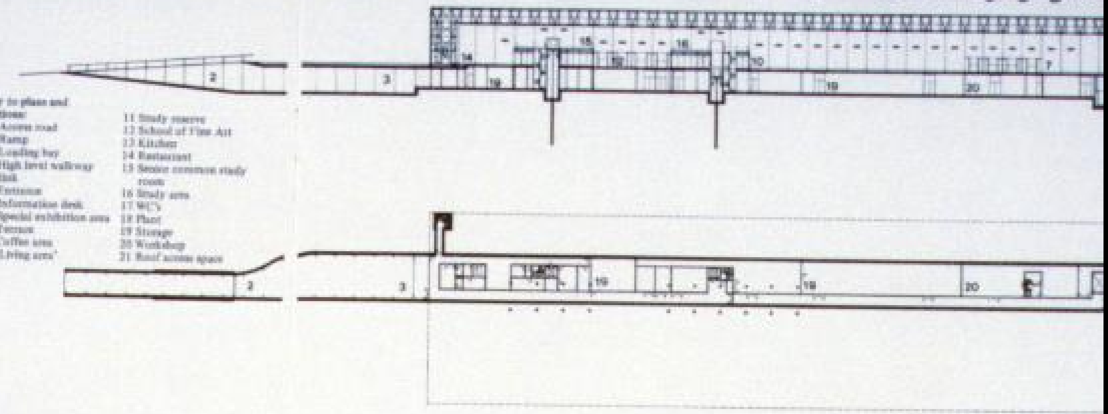
Given the progressive highly serviced and technological 'display' that has tended to be associated with Foster Associates' buildings in the past, the Sainsbury Centre can either be seen as a special case (as a university arts building) or alternatively marking a change in emphasis of Foster's use of advanced technology. The diagrammatic concept clicks around a concern to exploit the 2.1m deep, spectacular, free-spanning structural system eventually chosen, as a consistent service zone around the entire envelope of the building (since the original proposal to express the structure externally was shelved).

This zone – clad on one side with the glazed, solid (insulating) or louvred cladding system, and on the other, internally, with adjustable perforated aluminium louvres – is able to variously temper the environmental conditions within the building, by filtering or preventing light, introducing and extracting air, and alternatively baffling or absorbing sound. It houses service rooms at ground level and provides catwalk access across the roof to the lighting system and roof panels. Rather than the conspicuous if decentralised servicing of Willis Faber, which is displayed as part of the building yet justified by its efficiency, the servicing of the Sainsbury Centre, decentralised in a similar manner, is deliberately low key – epitomised by the concealed, mirrored service doors in the external elevation. Internally the service entrances are similarly disguised as part of the overall consistent louvred internal finish. As Foster notes, the servicing is sensed rather than visible – magically responding to the changing light levels.[18]

The concept of the building as machine has variously haunted architects in the 20th century. The Centre's visible response to the changing external environment brings the building close to re-enacting the Constructivist ideal of an objective architecture of technical function; bearing a striking, if pragmatic, similarity to Moholy Nagy's vision of a 'light architecture'.[19]

Foster's container for culture conditions its internal environment discreetly, as a 'sensitively controlled box' – its cameras and security system recessed into perforated walls. This stress on security, it could be argued, has had a not inconsiderable influence both on the siting and organisation of the building (the security system extends into the university grounds). The 'living' area for the collection sits atop a concrete retained, excavated basement, whose presence speaks of the insurance liability of the collection. Foster, talking of his visit to Louisiana museum outside Copenhagen (with the Sainsburys while researching the project), was impressed by the 'social ingredient' of the place: 'everybody was there, everybody was enjoying it, the kids were there, the old age pensioners were there, it was a great fun place – what was also very exciting were the displays, which were not over-protected, were really respected . . .' While enjoying the relaxed atmosphere, he deplores the lack of attention to servicing and security: '. . . *their reception facilities . . . it was almost naïve, you really felt that with a screw driver you could have opened the whole place up and taken whatever was in storage away . . . if they had a Japanese exhibition which was due to come that week, and they were in a terrible state, they were going to have a container truck outside in the street and they were wondering how to get security between the street and this particular entrance here in such a way they can move these precious objects from the container into the building itself.*'[20]

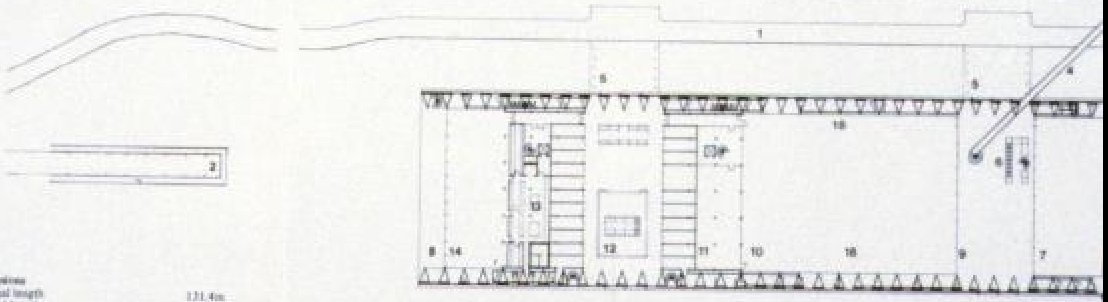
The Sainsbury Centre solves the dilemma by hiding underground its service entrance for receiving

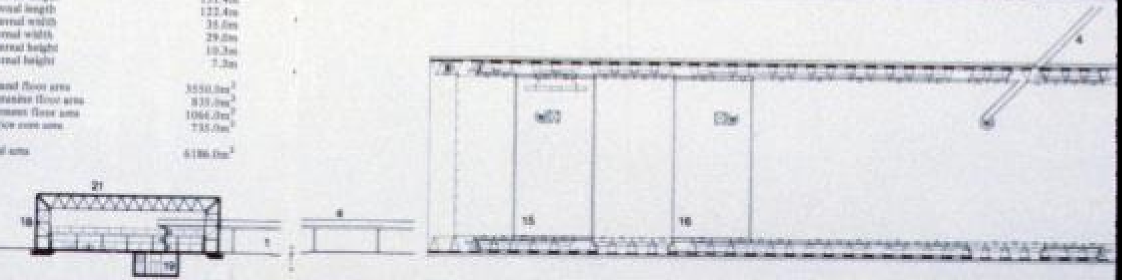


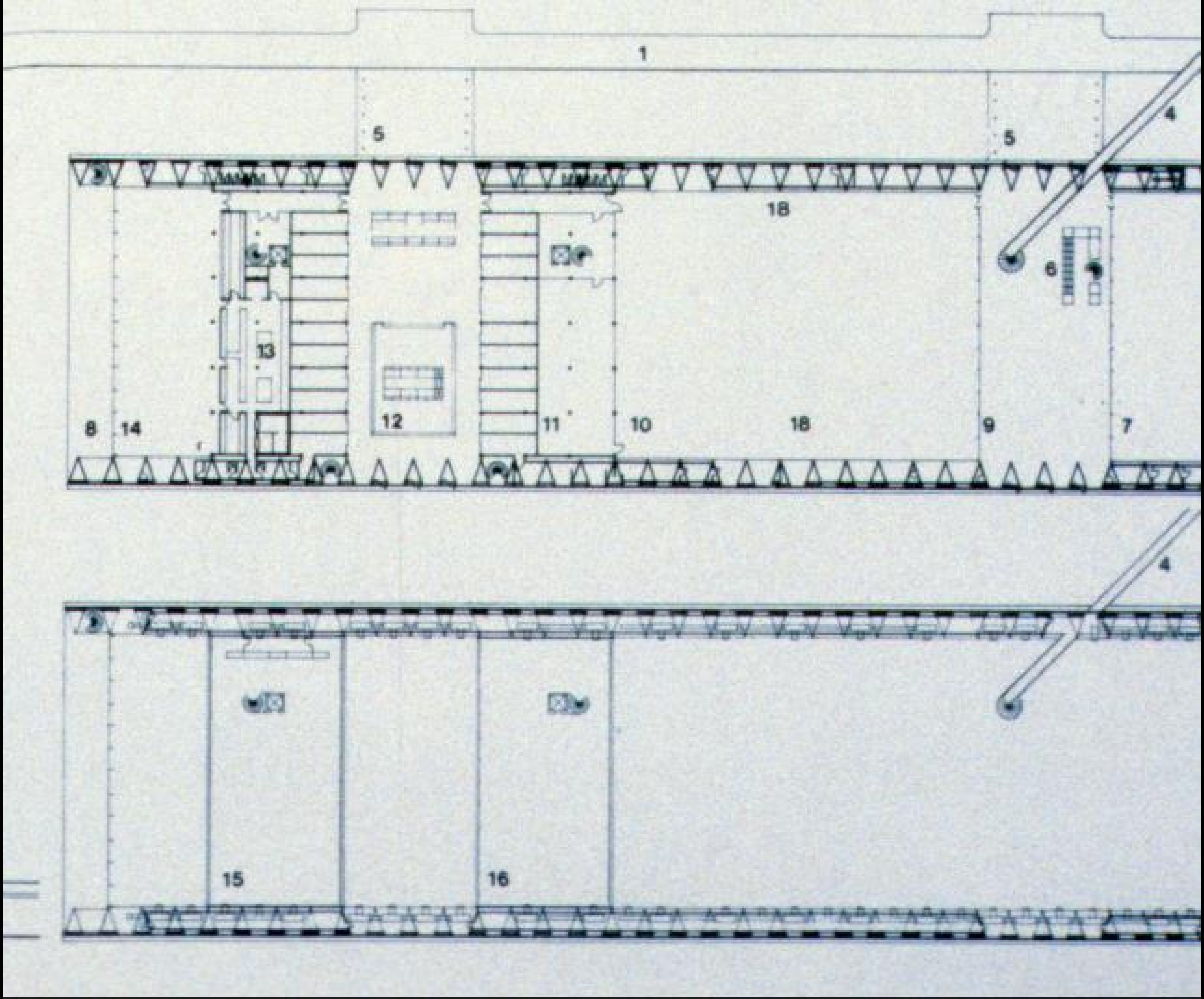
Key to plans and sections
1 Access road
2 Ramp
3 Loading bay
4 High level walkway link
5 Entrance
6 Information desk
7 Special exhibition area
8 Terrace
9 Coffee area
10 'Living area'
11 Study reserve
12 School of Fine Art
13 Kitchen
14 Restaurant
15 Senior common study room
16 Study area
17 WC's
18 Plant
19 Storage
20 Workshop
21 Roof access space

Dimensions

External length	131.4m
Internal length	122.4m
External width	35.0m
Internal width	29.0m
External height	10.3m
Internal height	7.3m
Ground floor area	3550.0m²
Mezzanine floor area	835.0m²
Basement floor area	1066.0m²
Service zone area	735.0m²
Total area	6186.0m²



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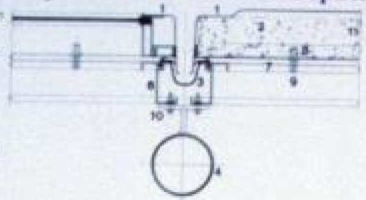
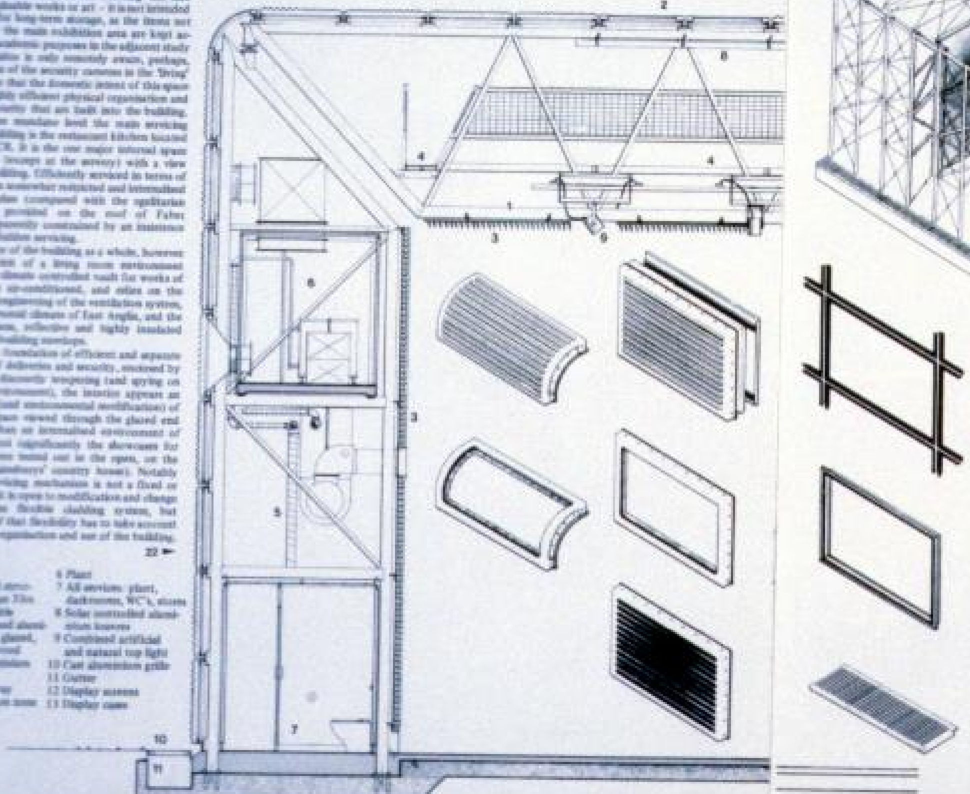
…strained by an insistence on discreetly hidden services in the spirit of a living room environment rather than a climate controlled vault for works of a…

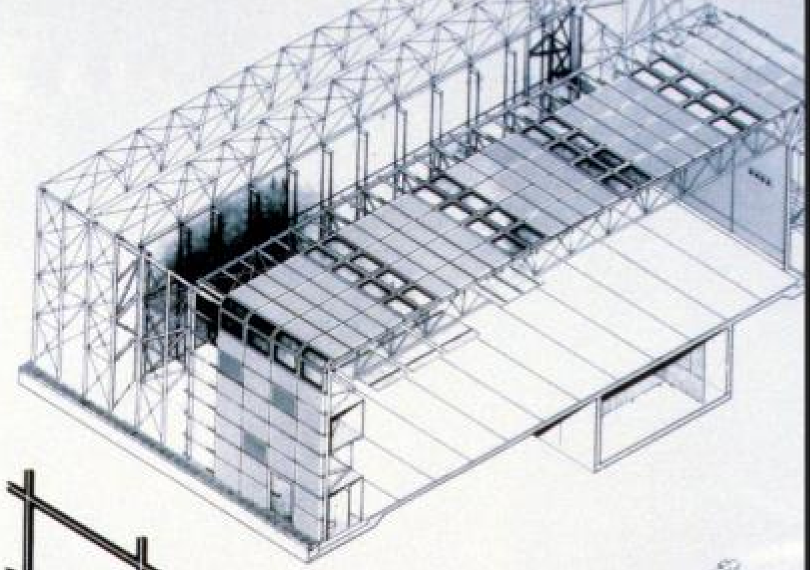
Typical cladding panel key:
1 Aluminium outer skin
2 Insulation core
3 Neoprene ladder gasket
4 Tubular steel frame
5 Laminated glass
6 Enamelled extruded aluminium subframe
7 Aluminium inner skin
8 Nut and bolt fixing
9 Stainless steel screws
10 Stainless steel nuts and bolts
11 Aluminium channel stiffener

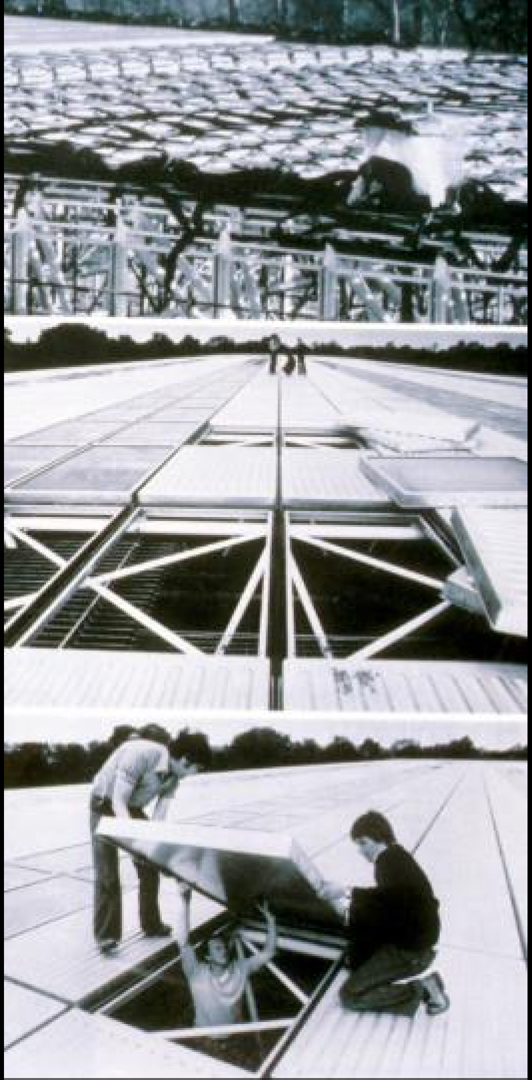




6 Plant
7 All services: plant, darkrooms, WC's, stores
8 Solar controlled aluminium louvres
9 Combined artificial and natural top light
10 Cast aluminium grille
11 Gutter
12 Display screens
13 Display cases

22 ►

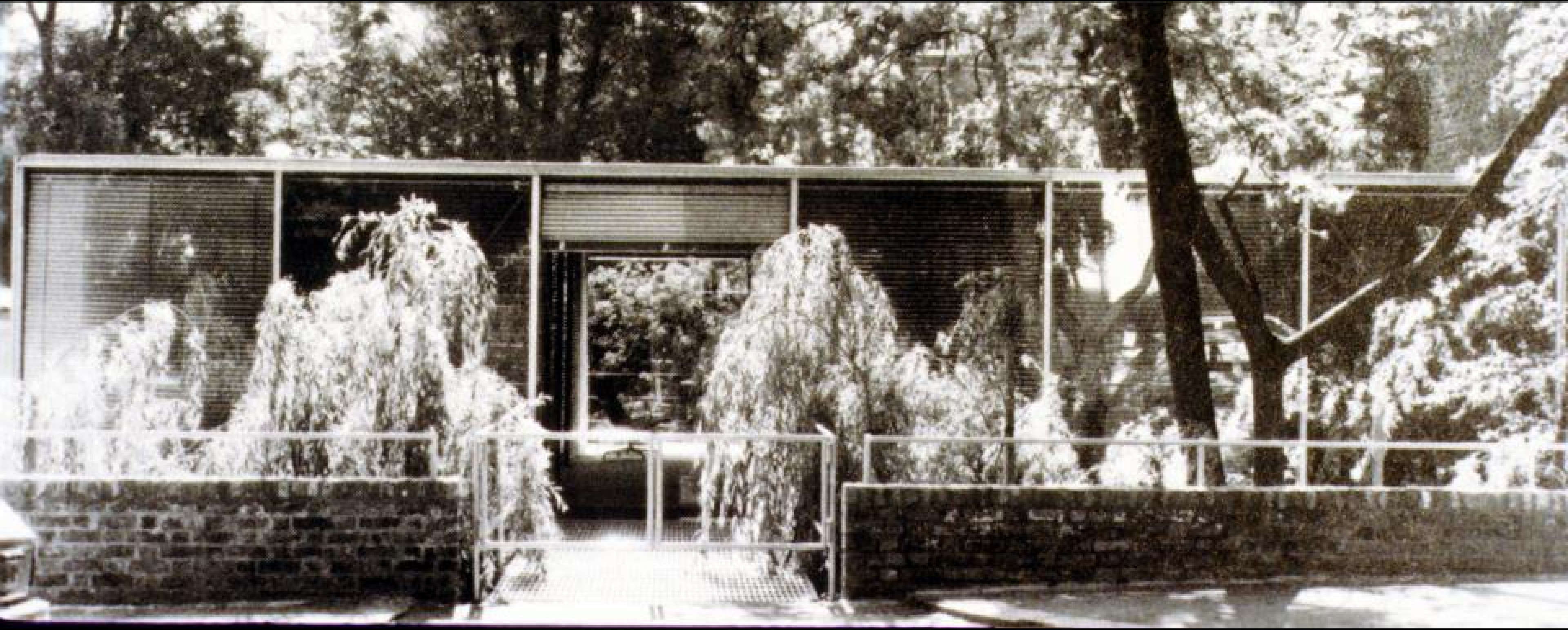




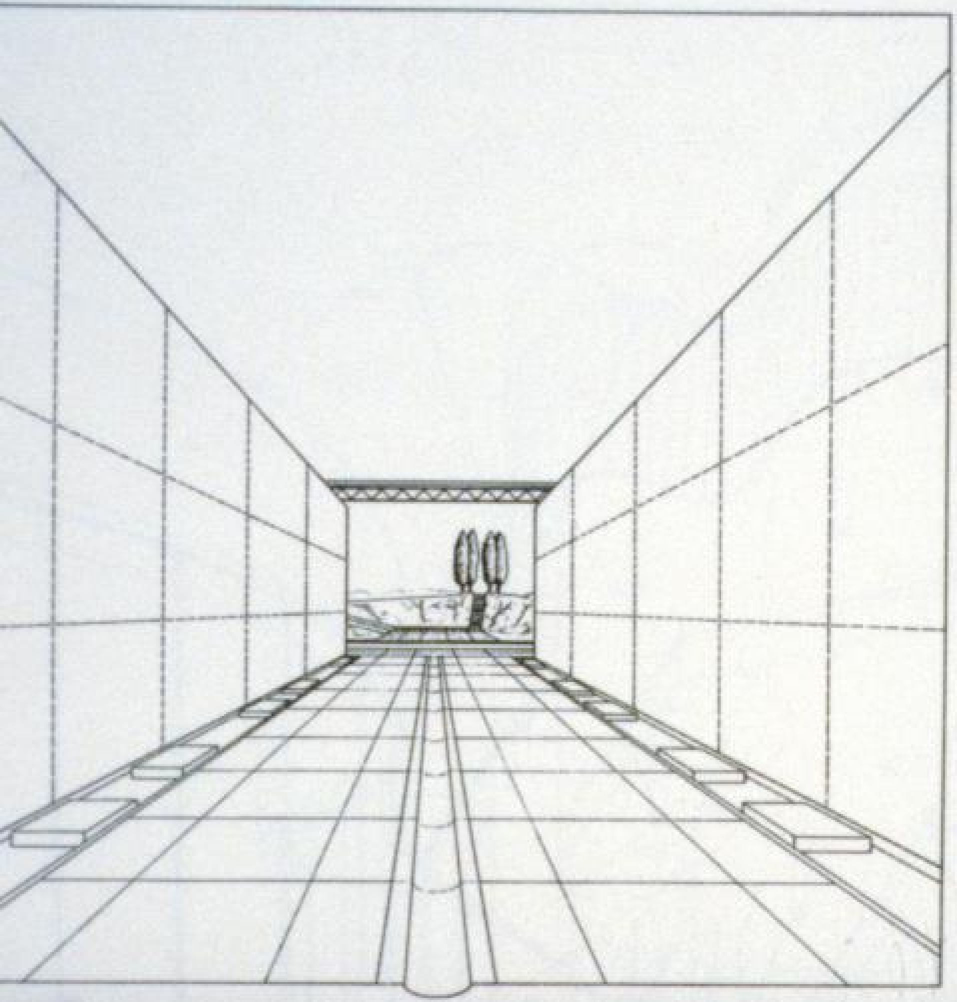

aret Mellis
in Colour
ng Norfolk
...The Art of Creation

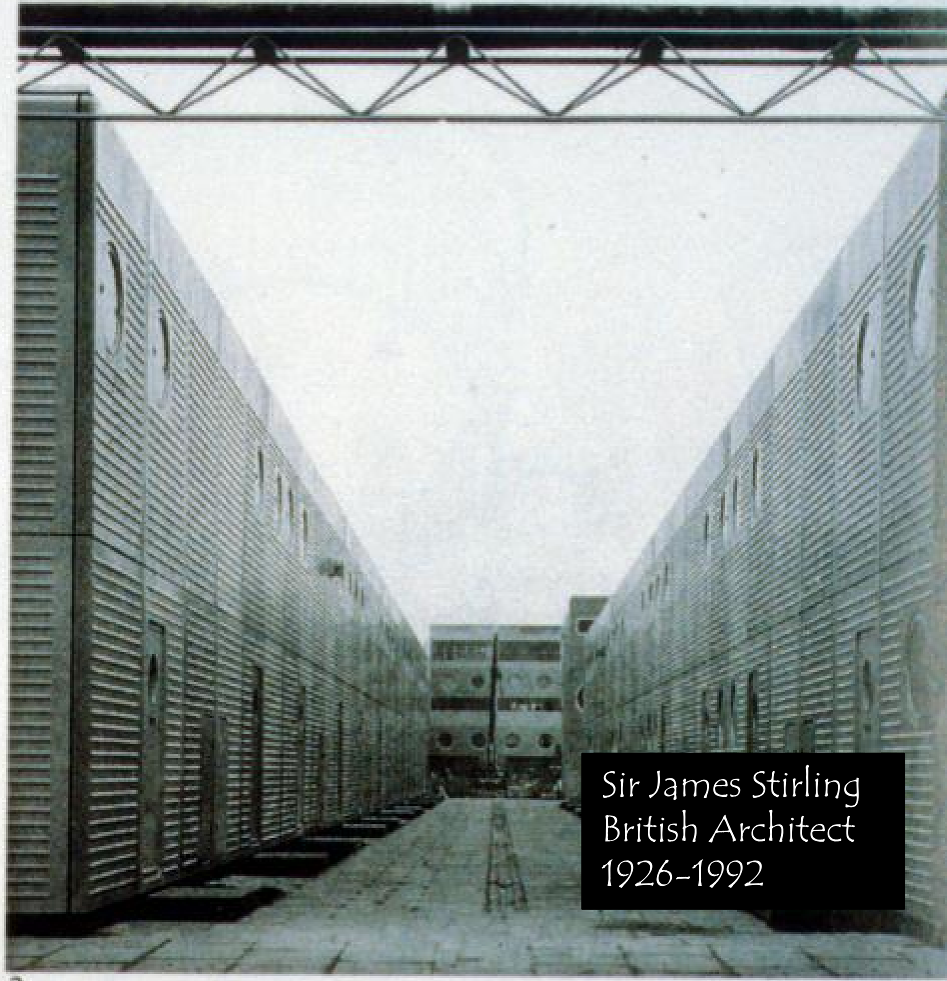
High Tech design approaches vary based on the choice to create custom components or use standard off-the-shelf materials

The historian Reyner Banham referred to these early buildings as "serviced sheds" as they exposed the structure and also all of the mechanical systems.



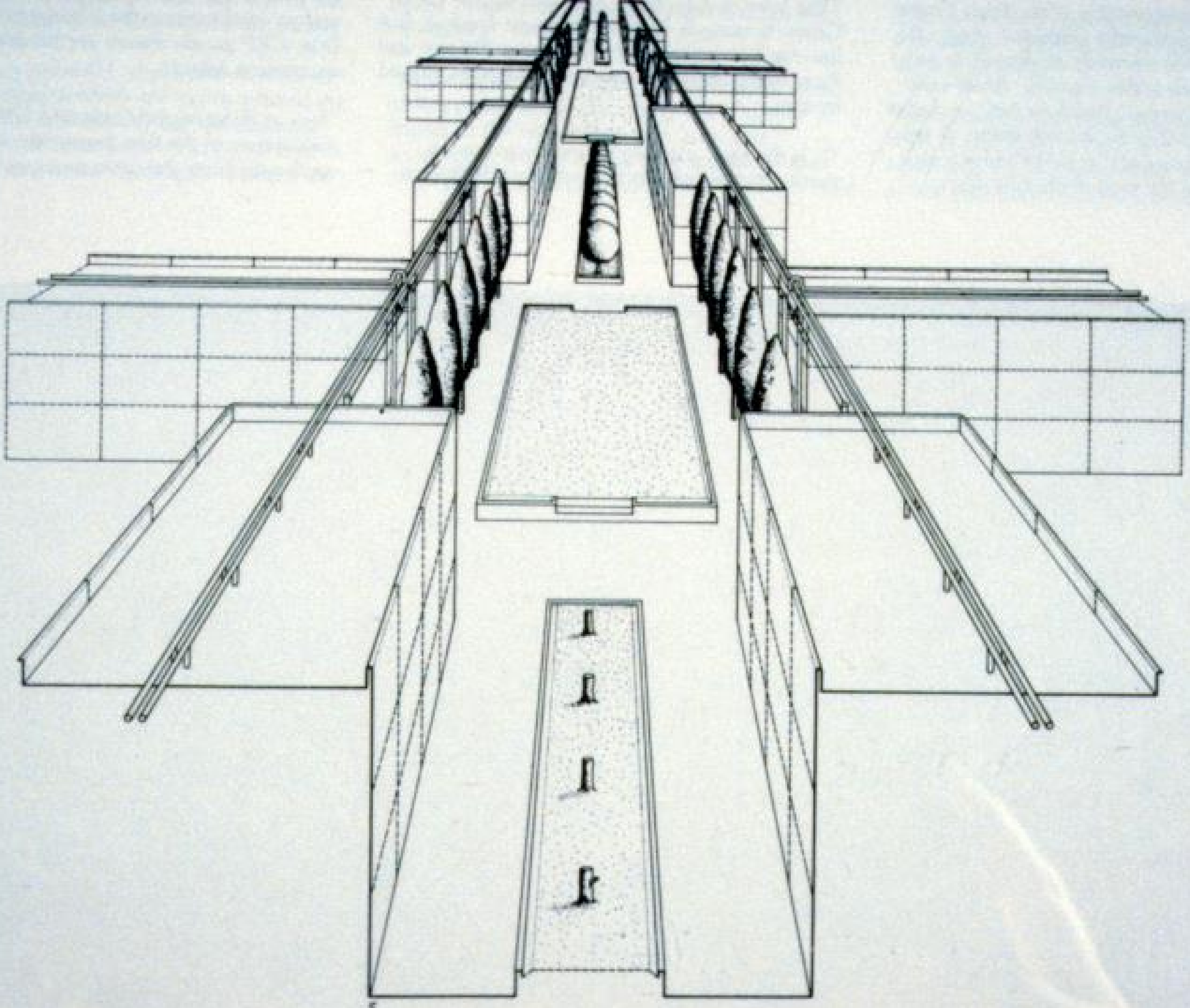
Residence
Michael Hopkins
1976

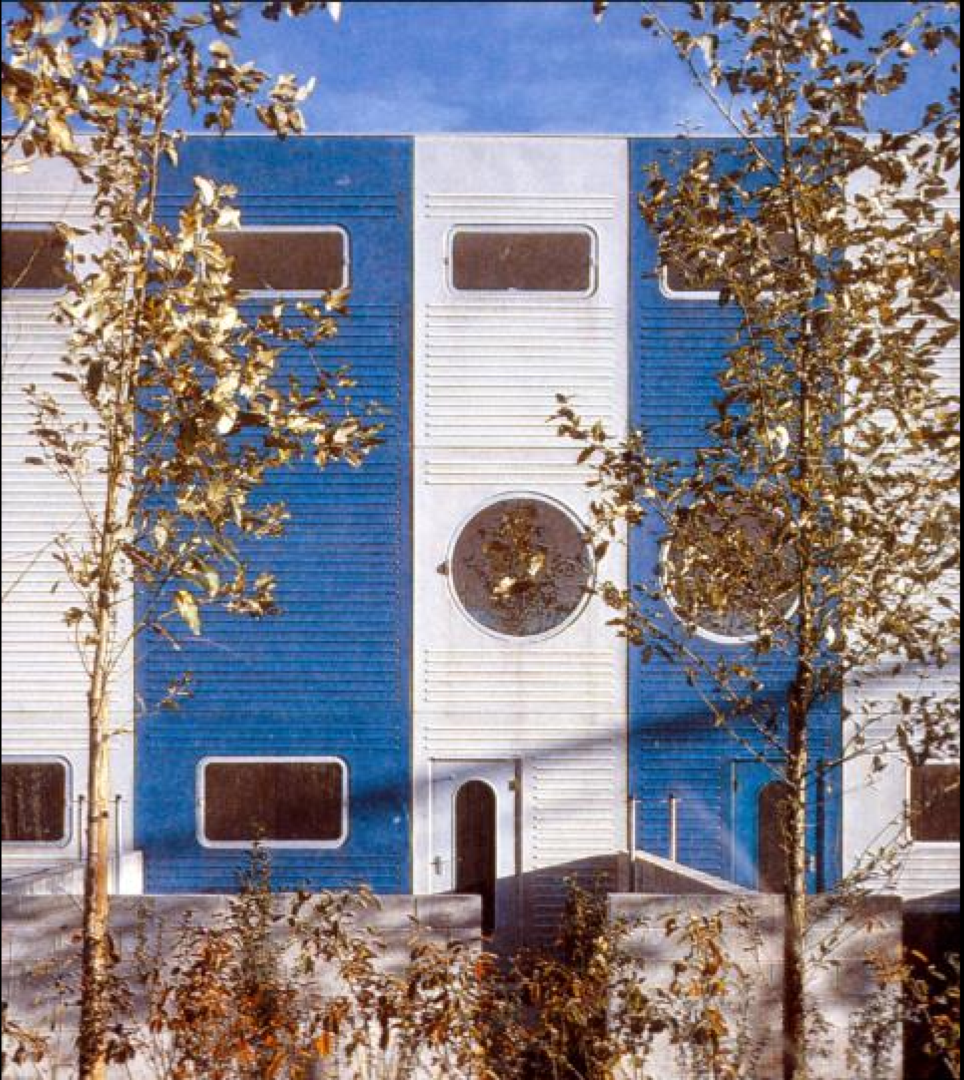


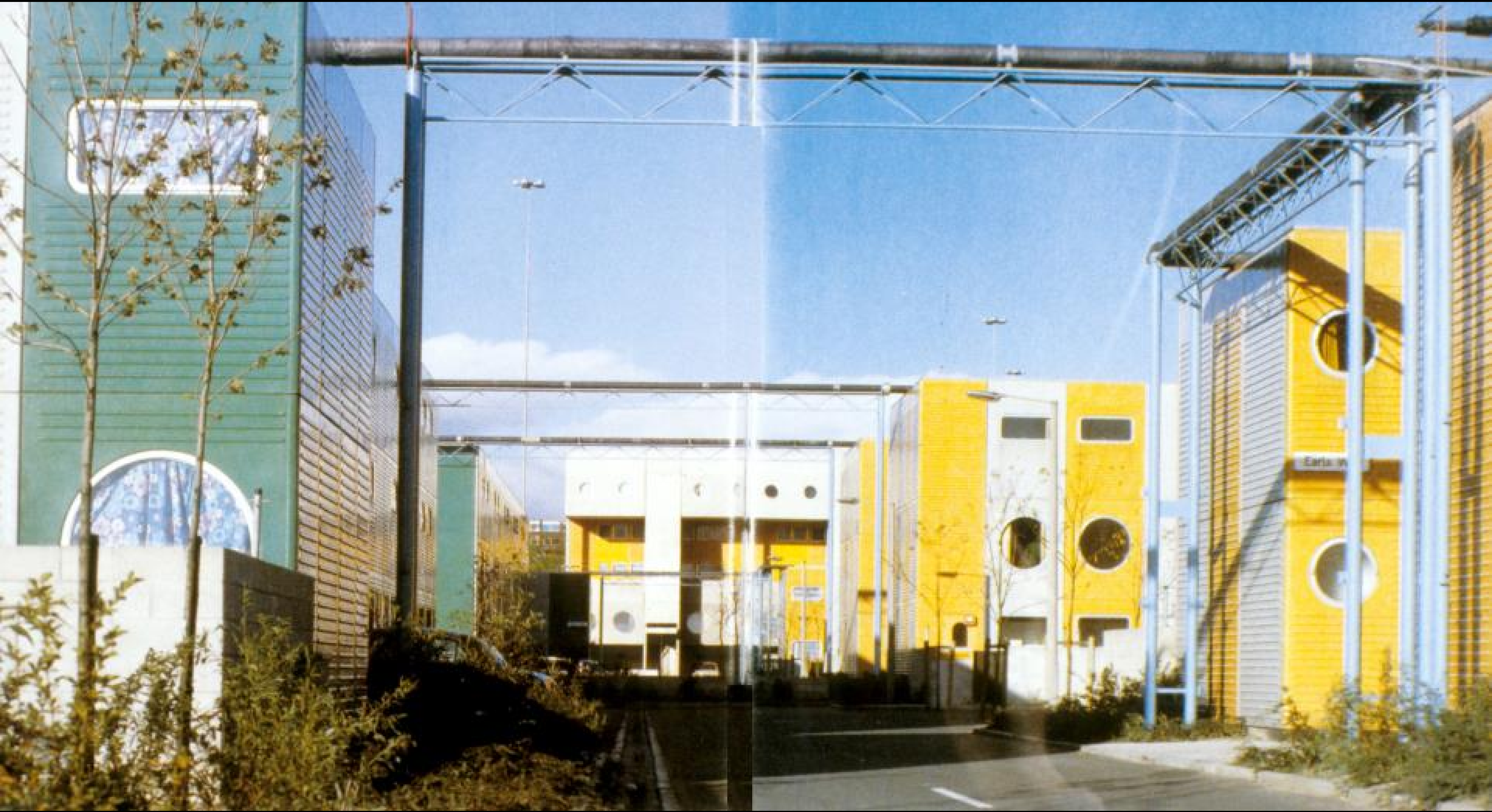


2

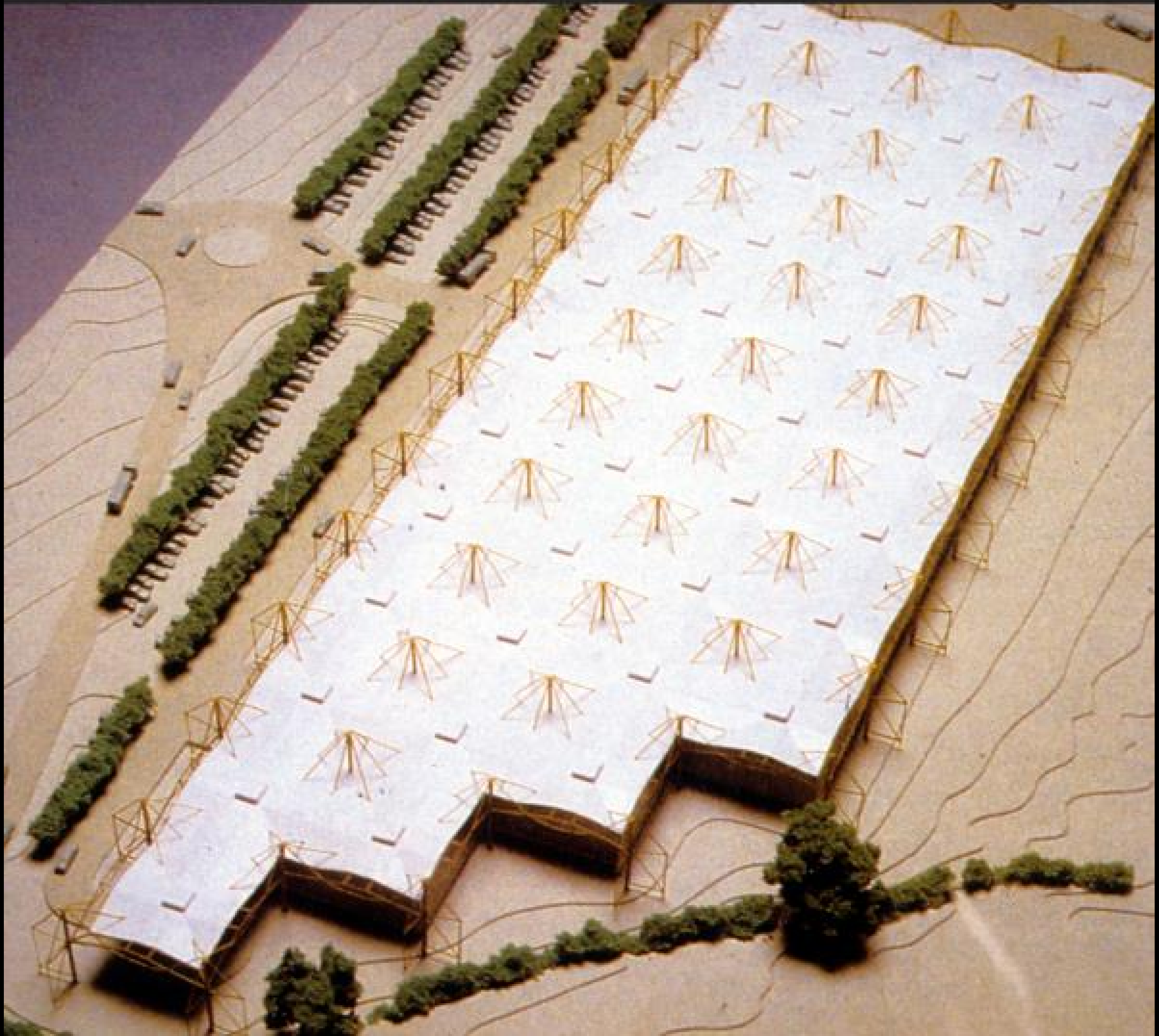
Sir James Stirling
British Architect
1926-1992

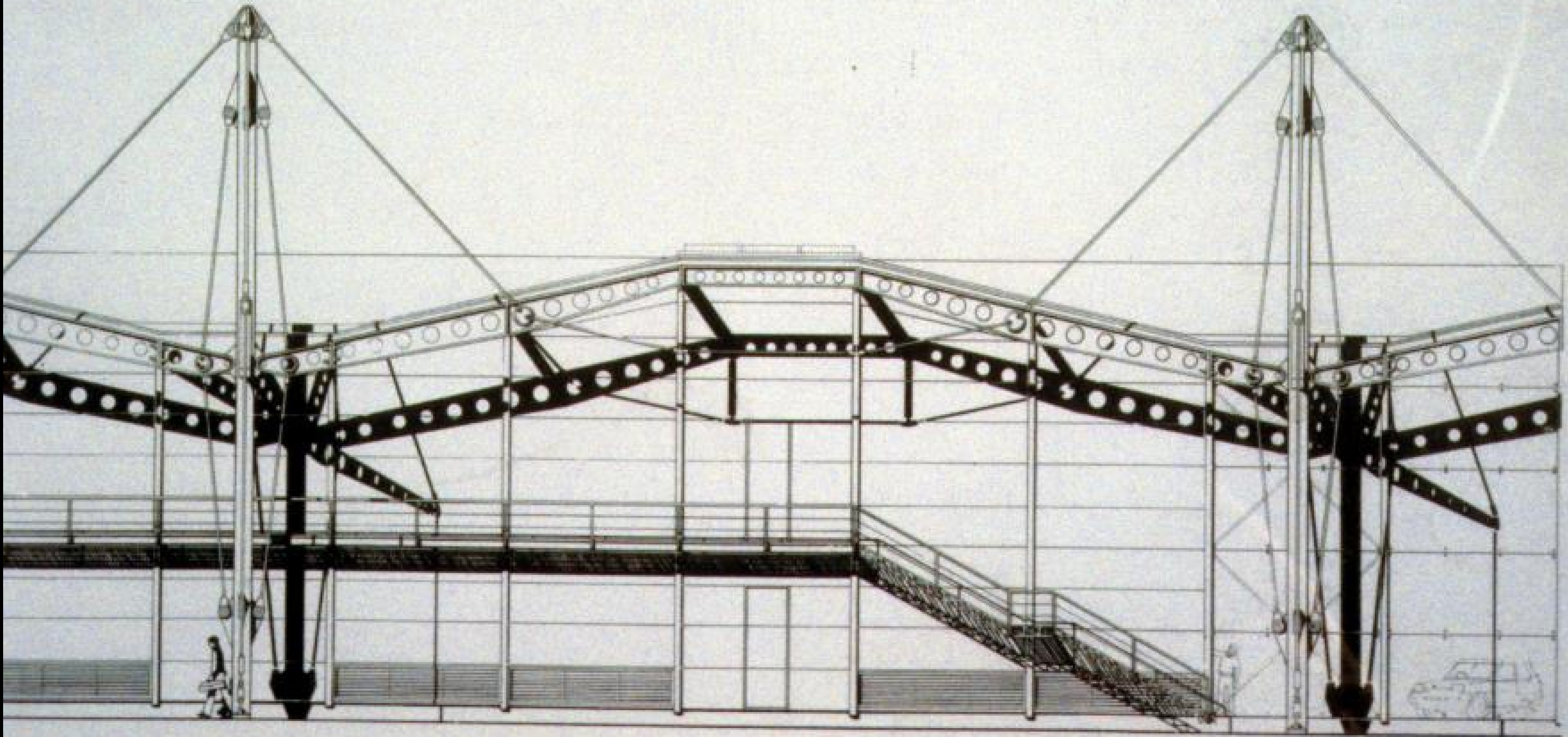


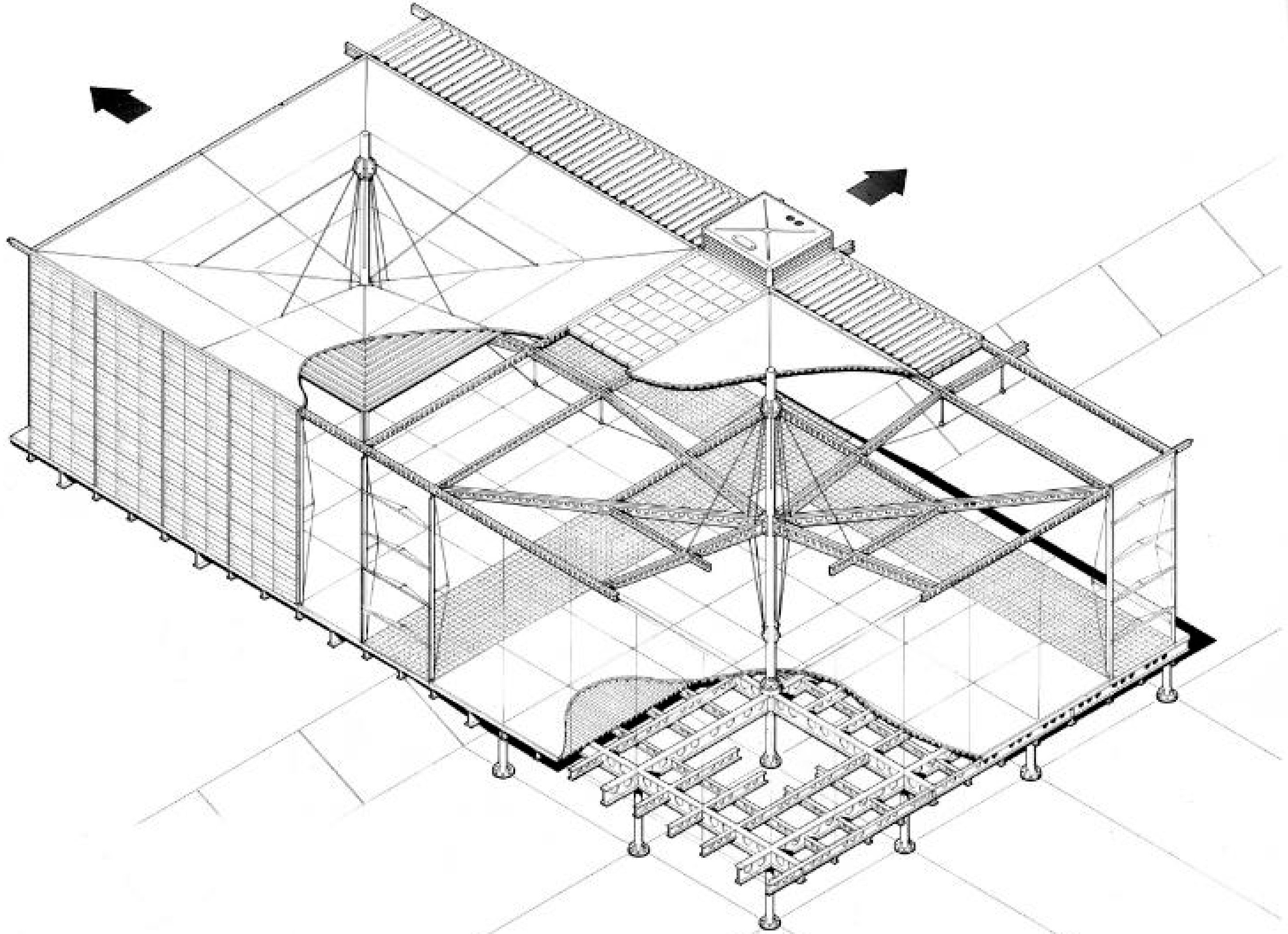


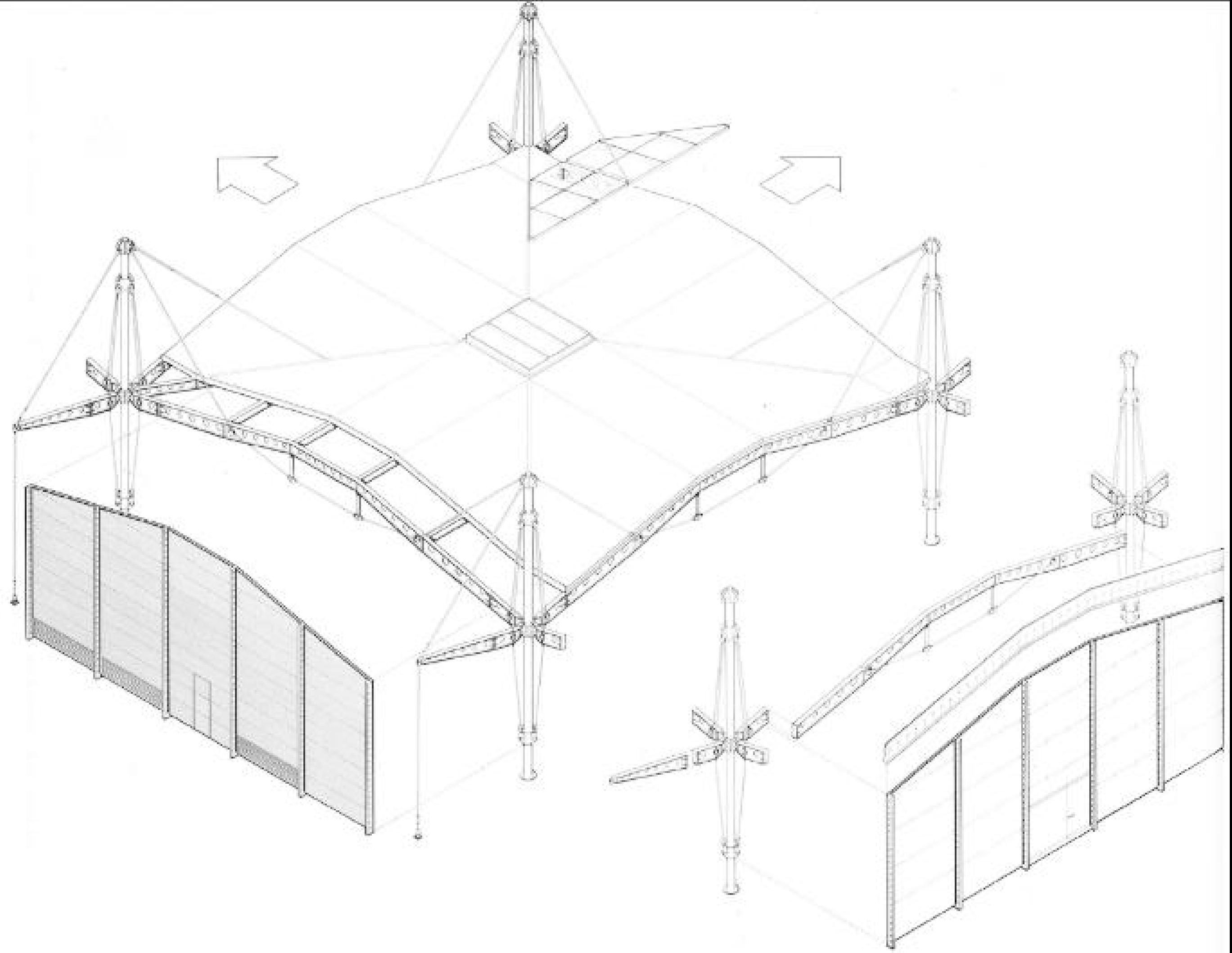


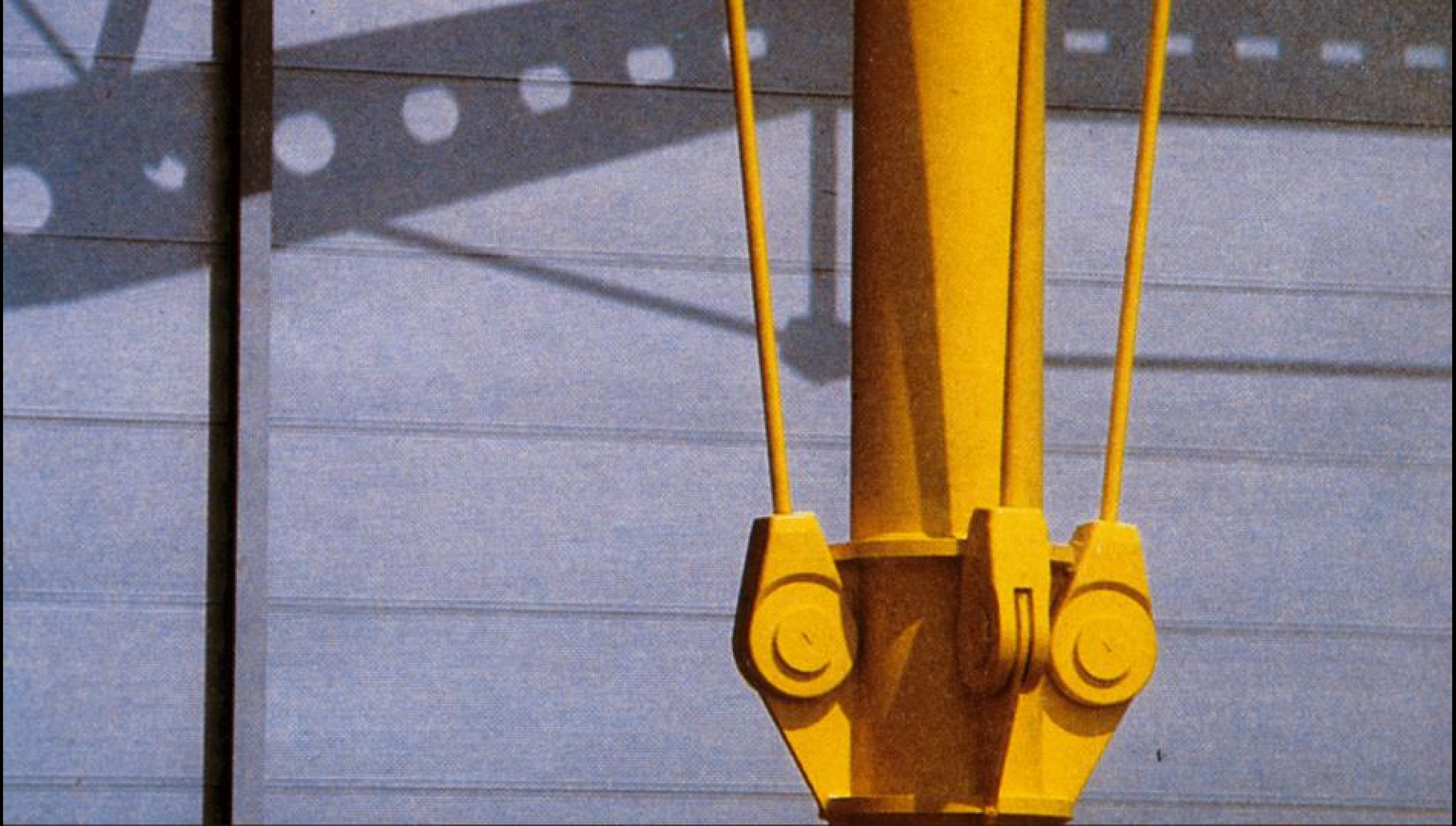
Renault Centre
Swindon, UK
Foster Associates
1982

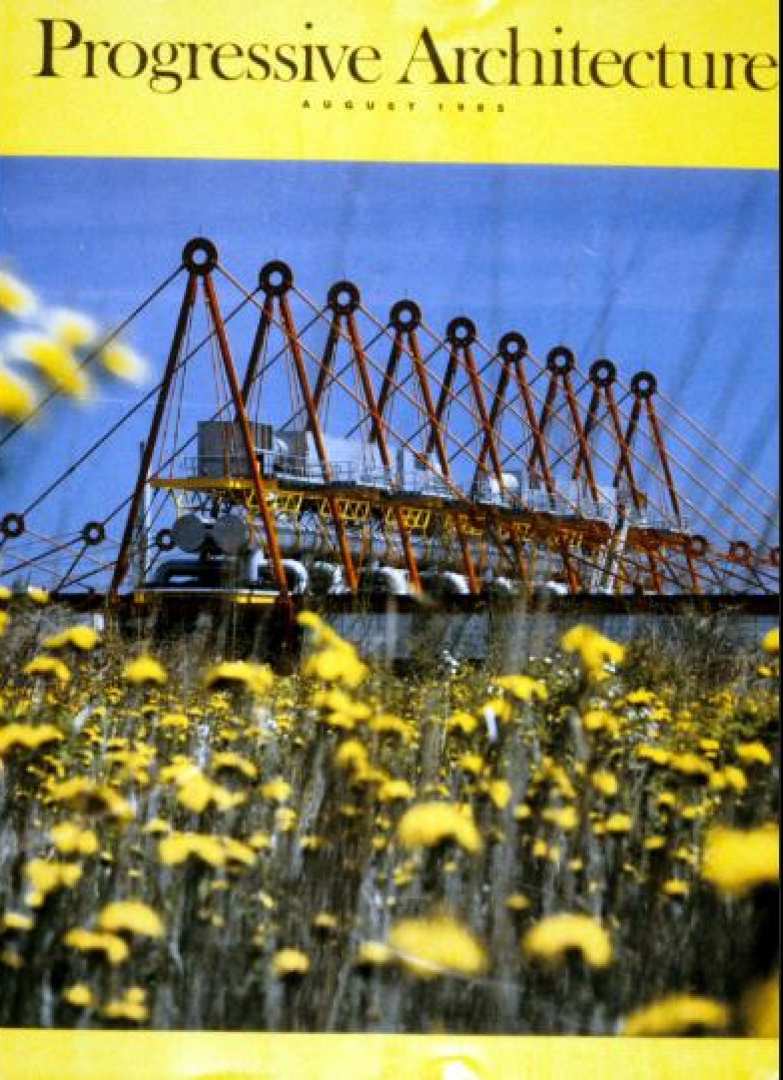




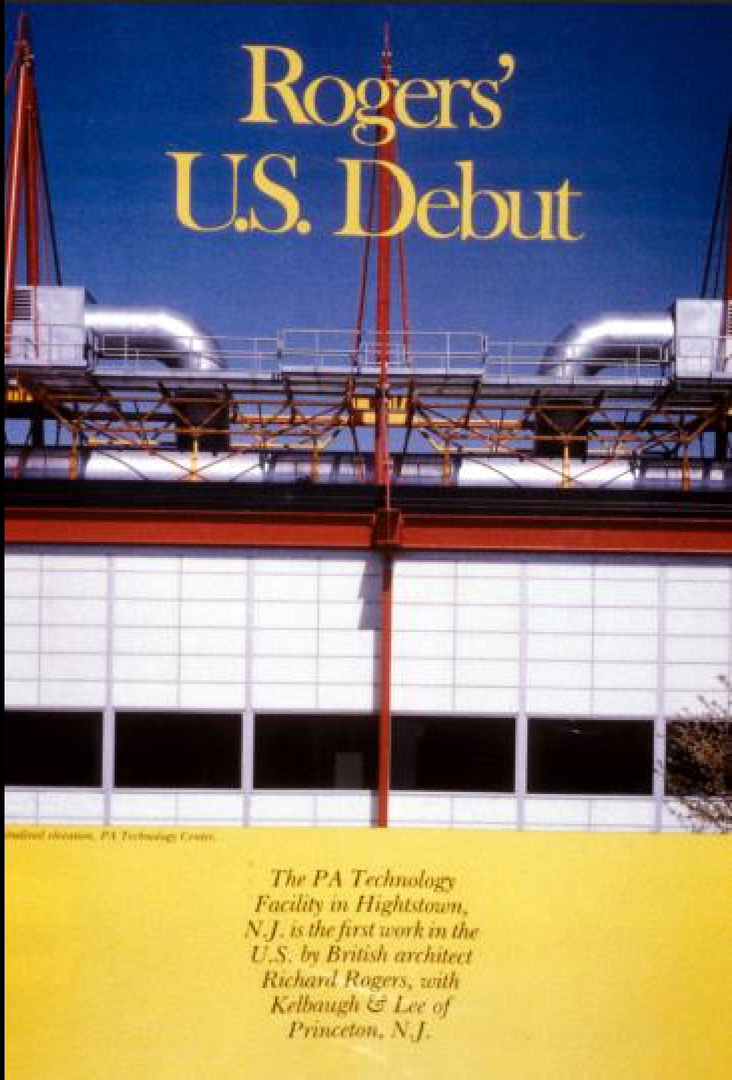


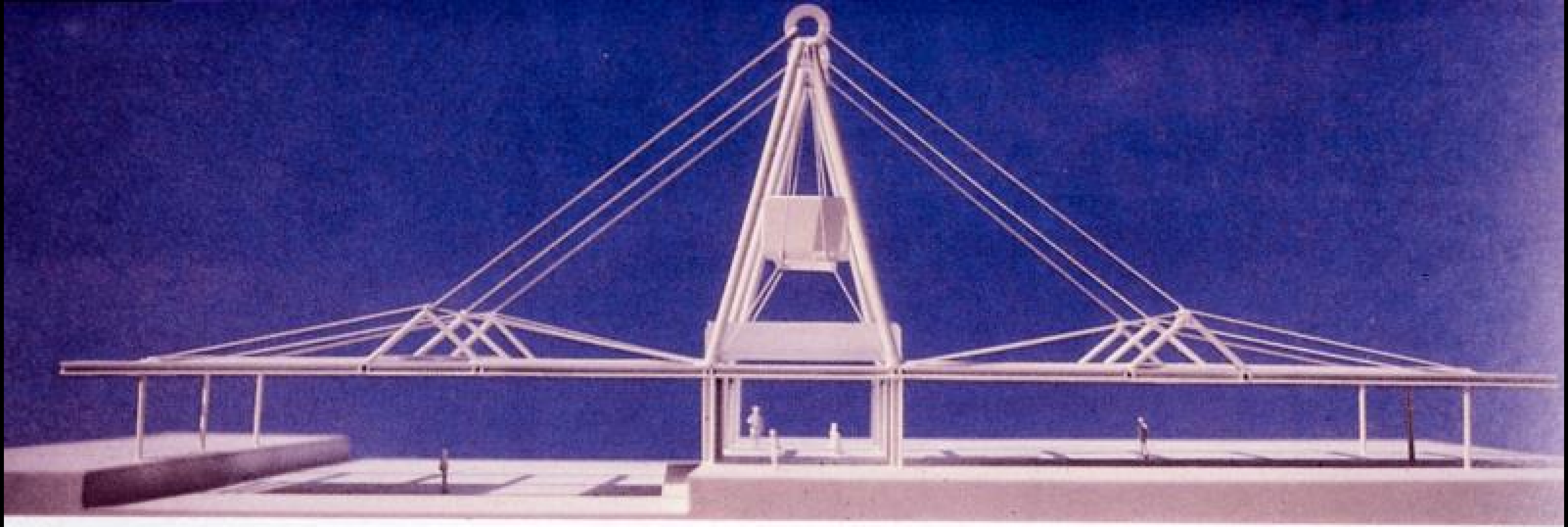




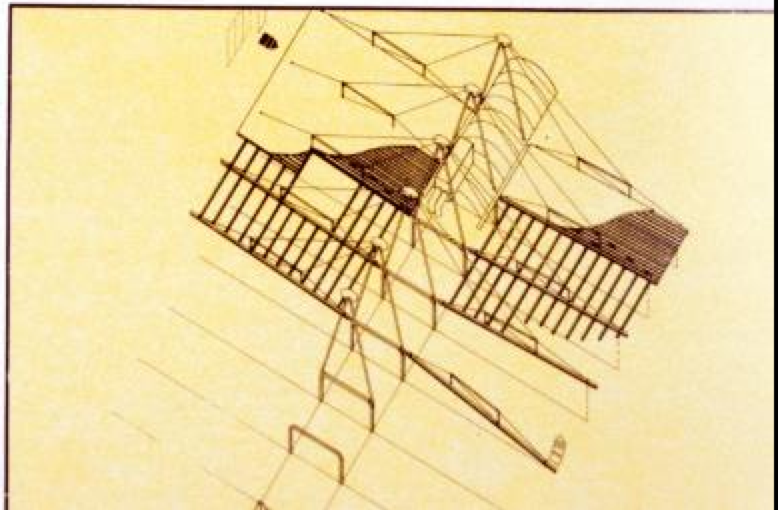


PA Technology
Hightstown, NJ
Richard Rogers
1985

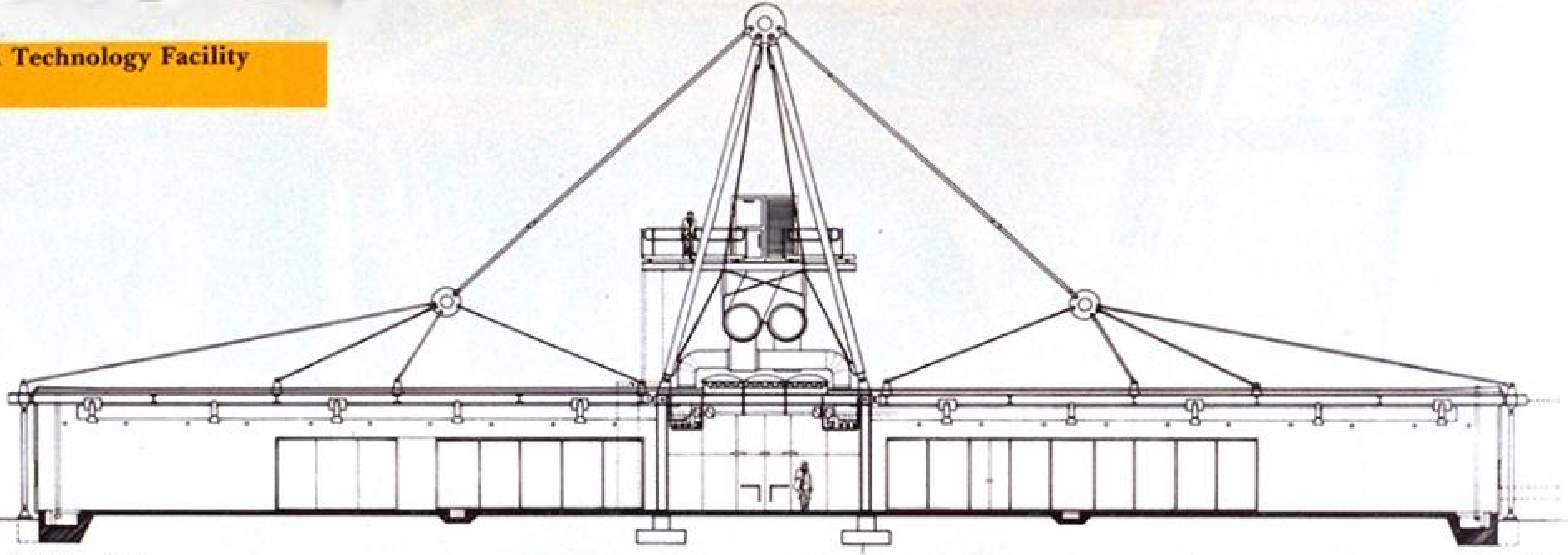




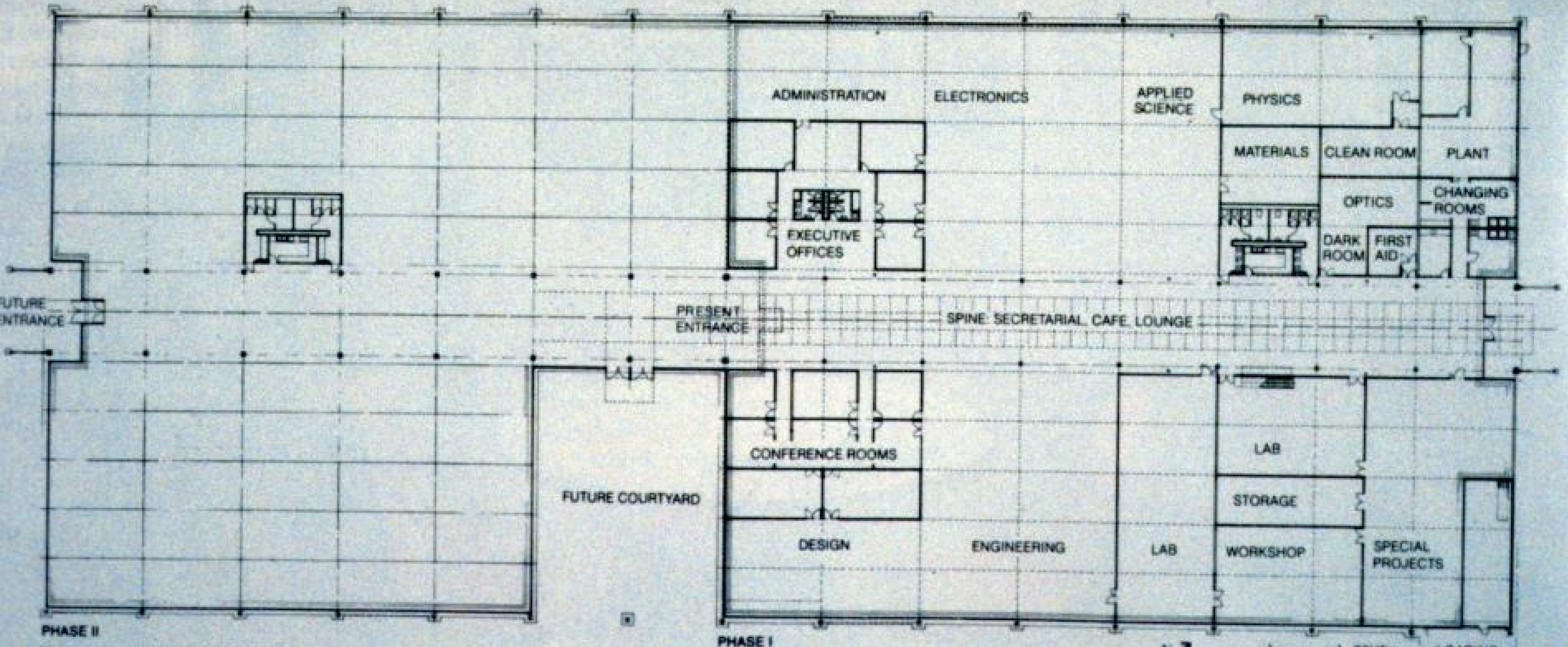
del of structure



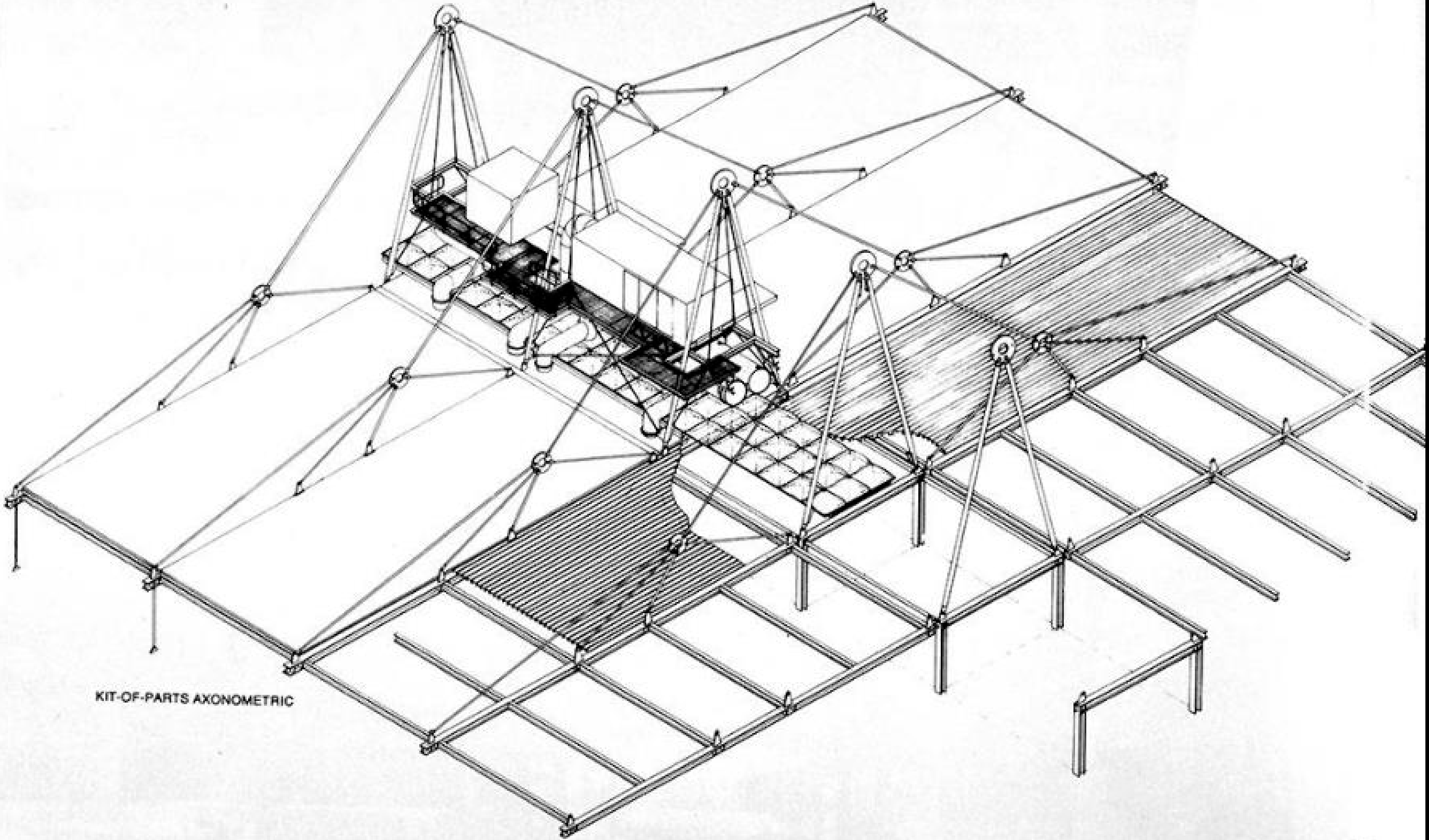
PA Technology Facility



CROSS SECTION



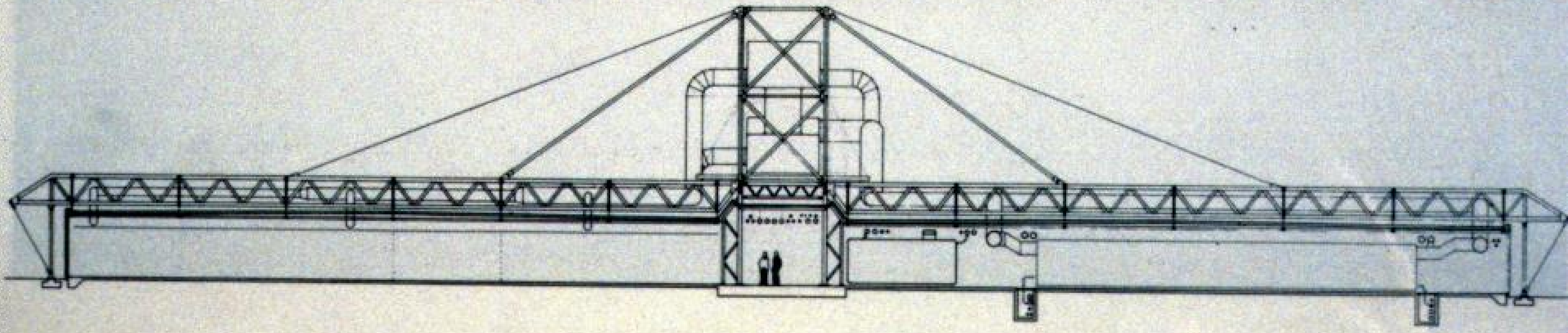
PLAN WITH FUTURE EXPANSION

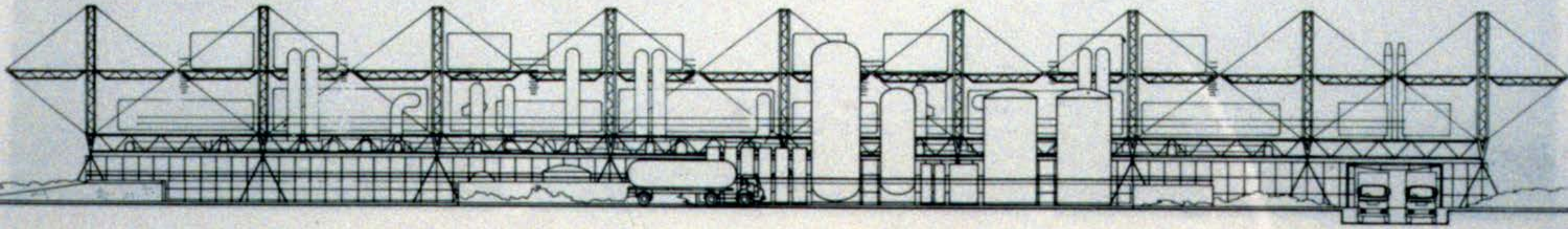


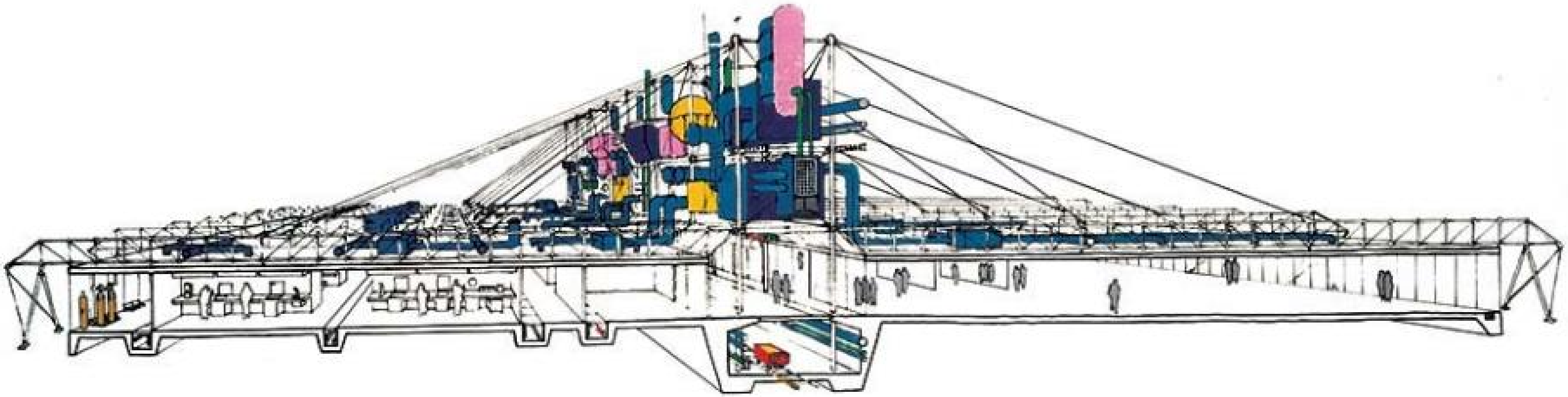
KIT-OF-PARTS AXONOMETRIC

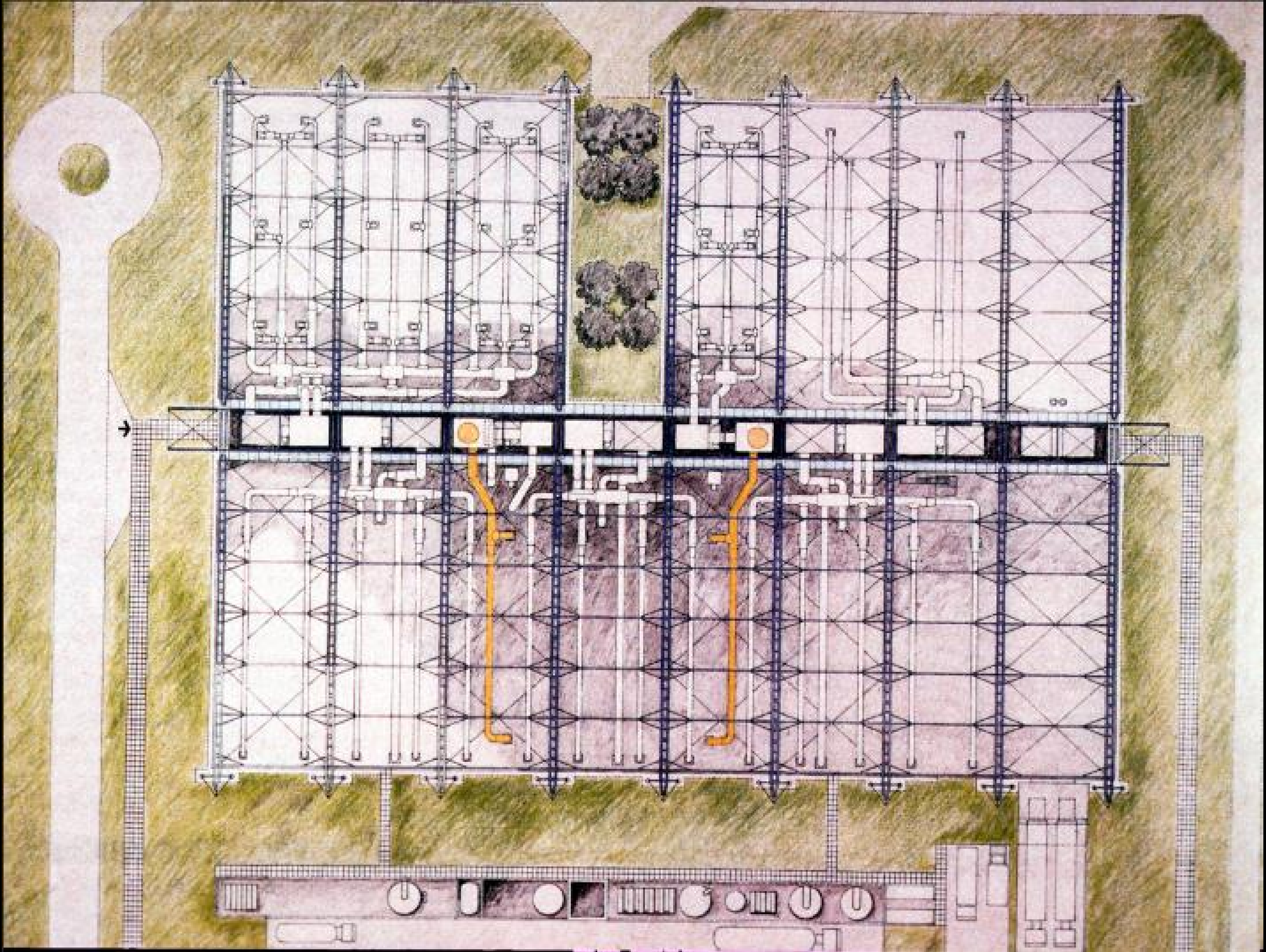

Hightstown, N.J.

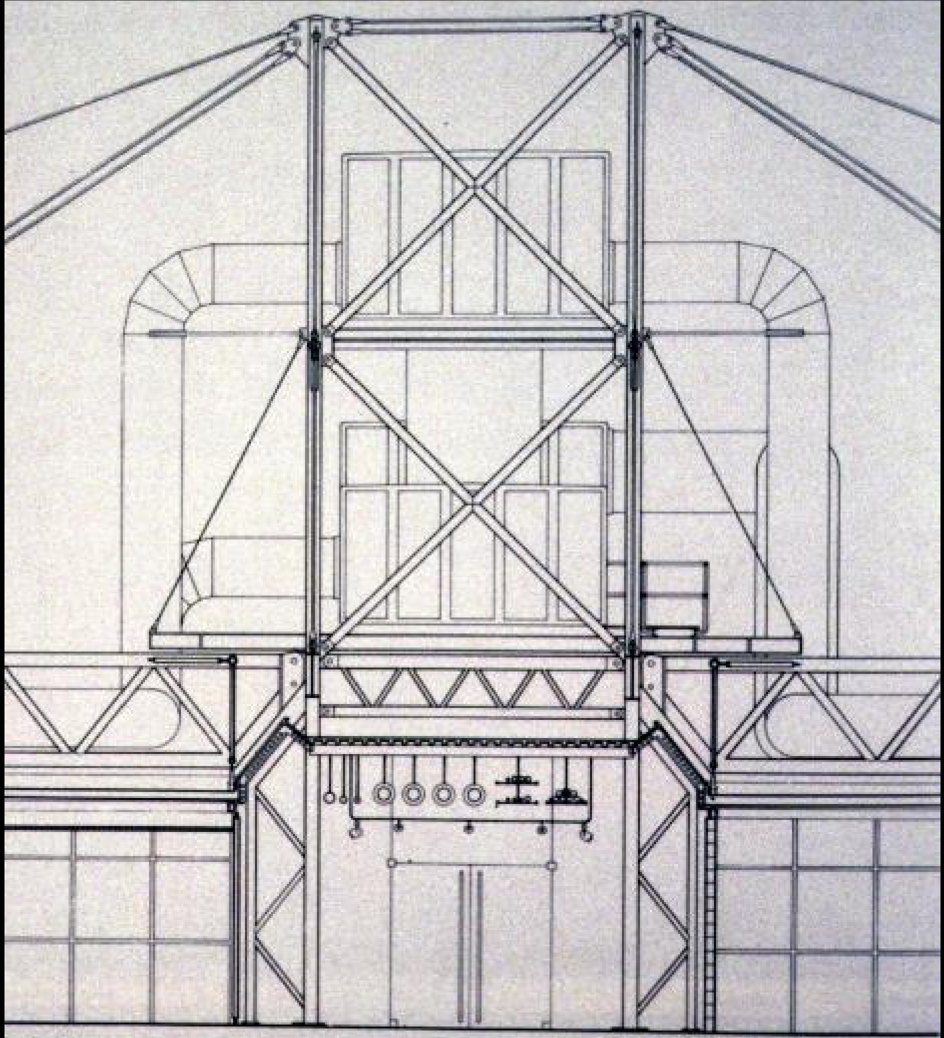
Inmos Technology
Newport, Wales
Richard Rogers
1982



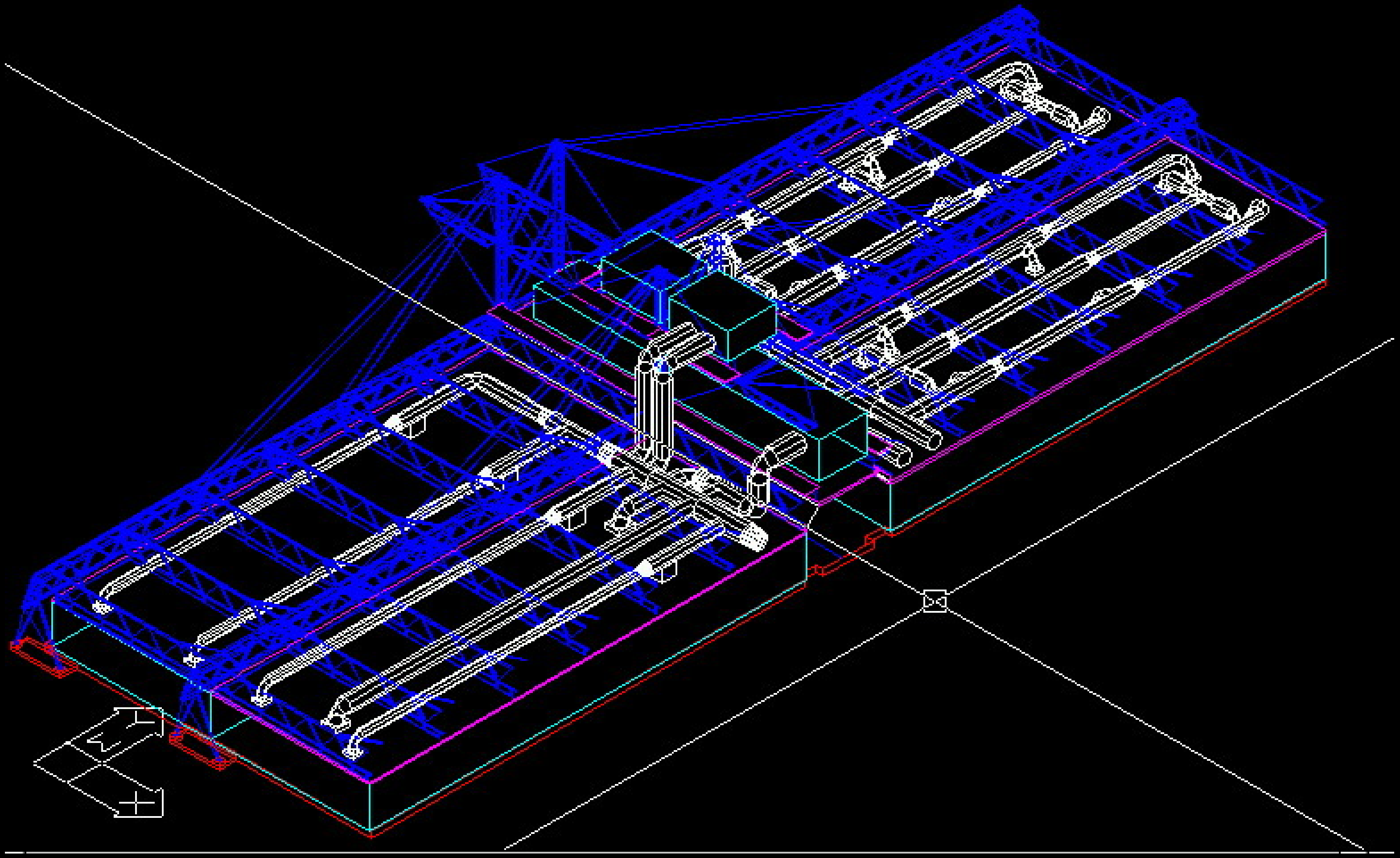


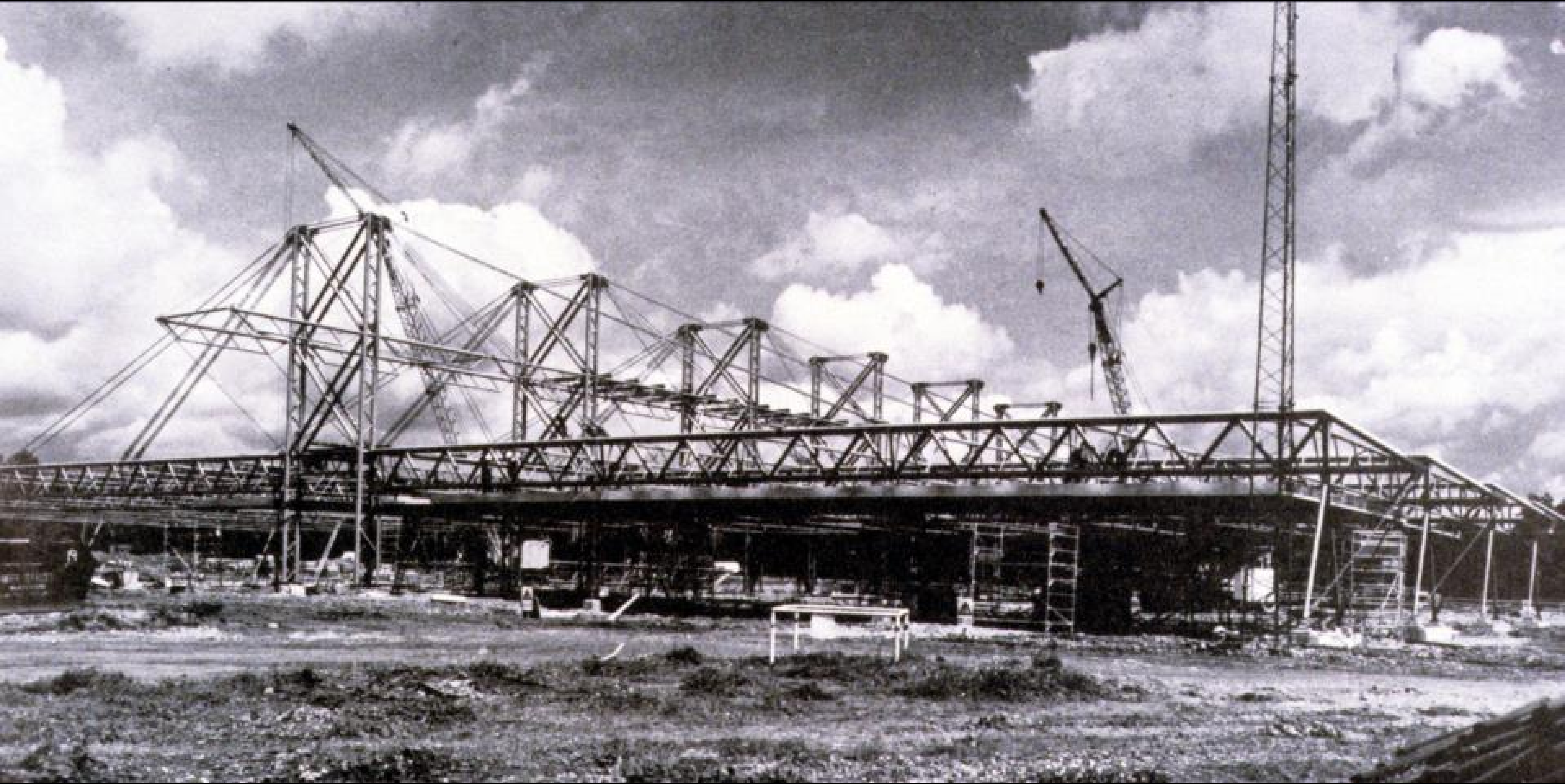






Detail of elevation

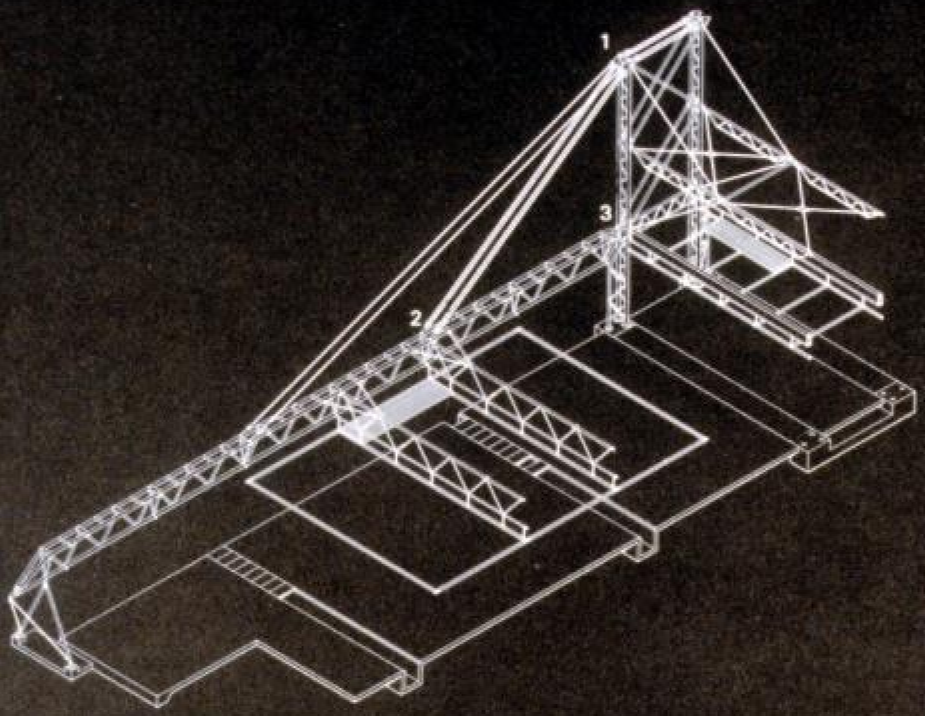


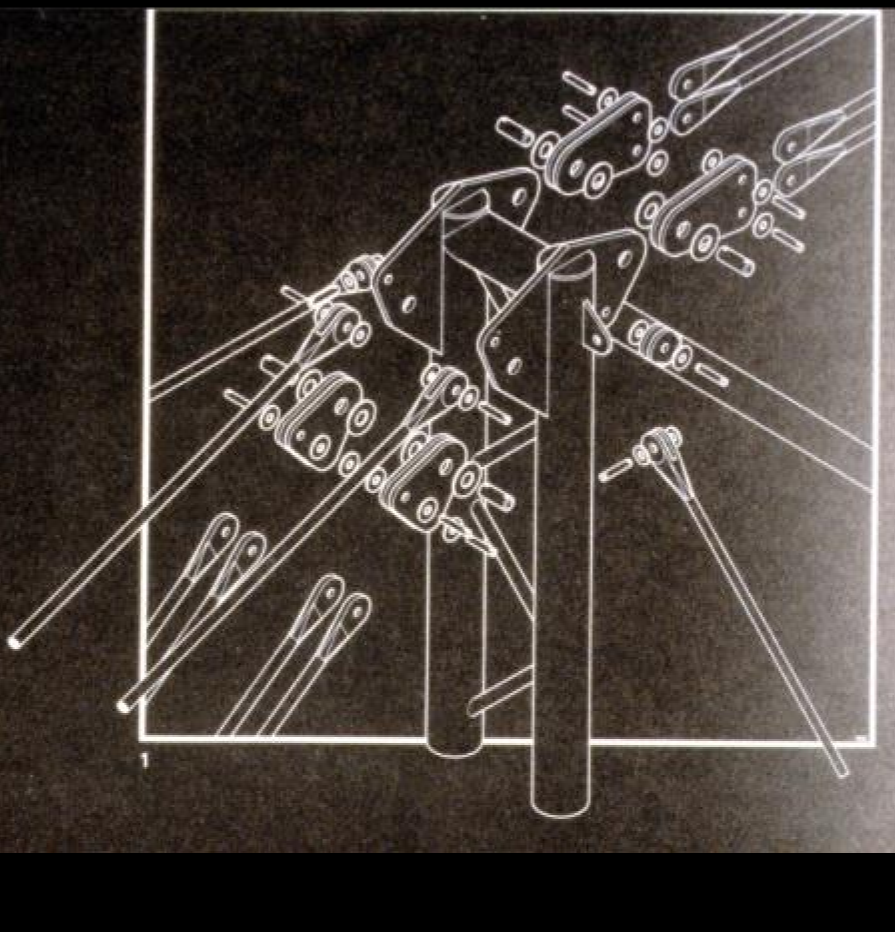


CONSTRUCTION SEQUENCE

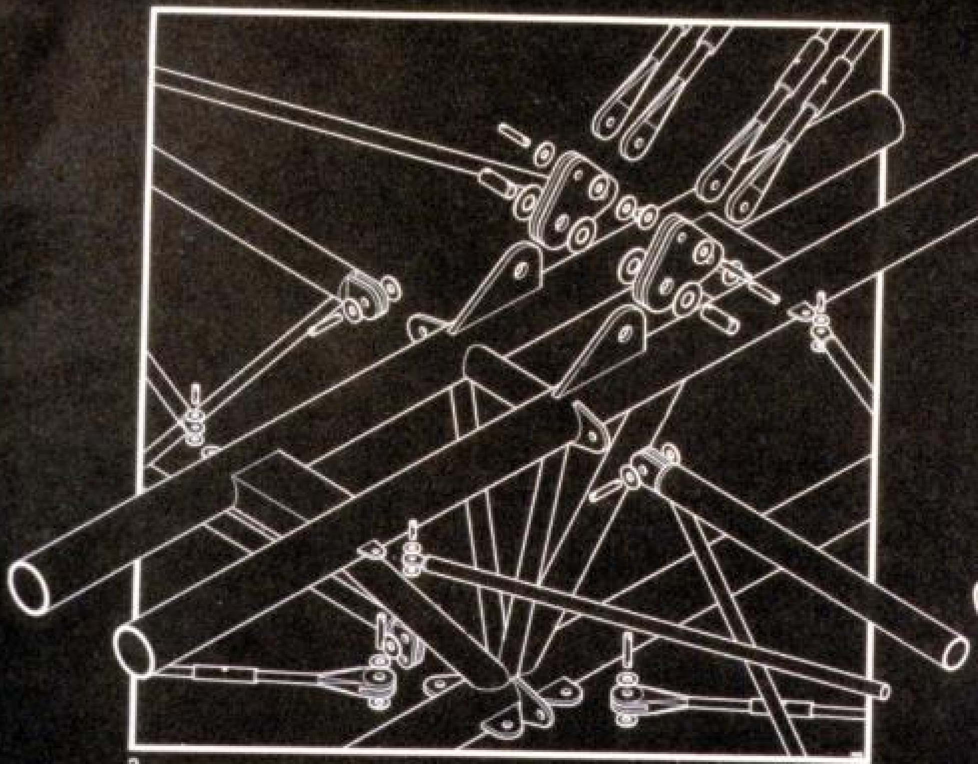






Structural axonometric with junction details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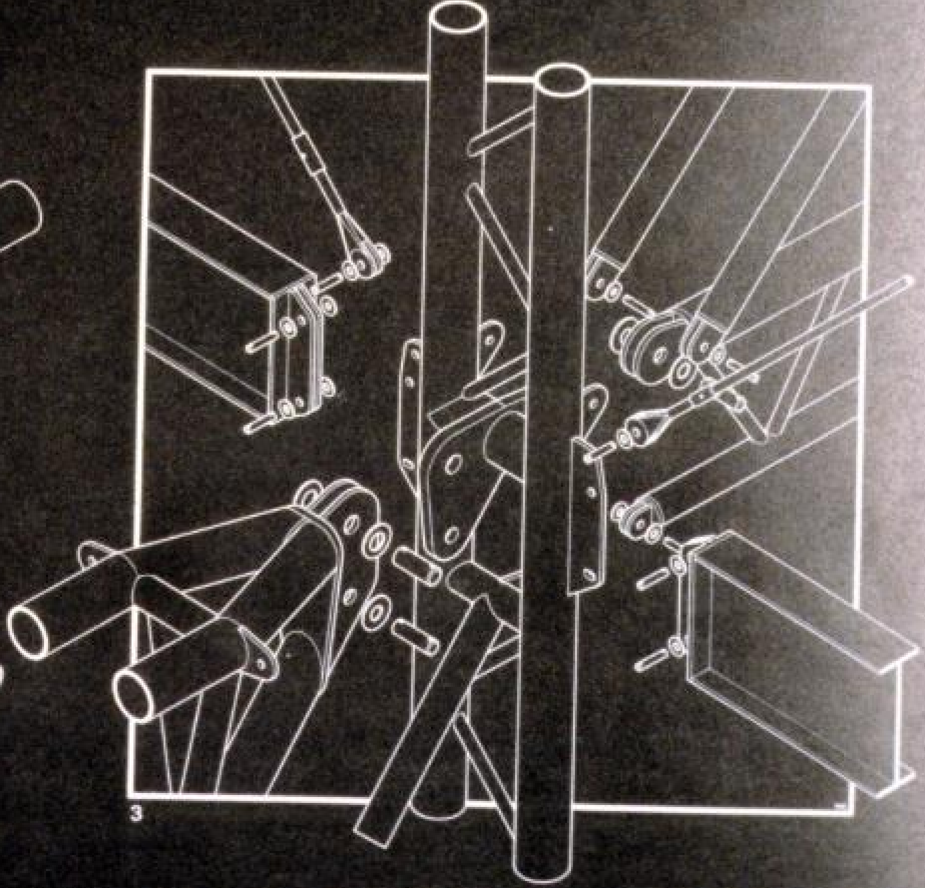
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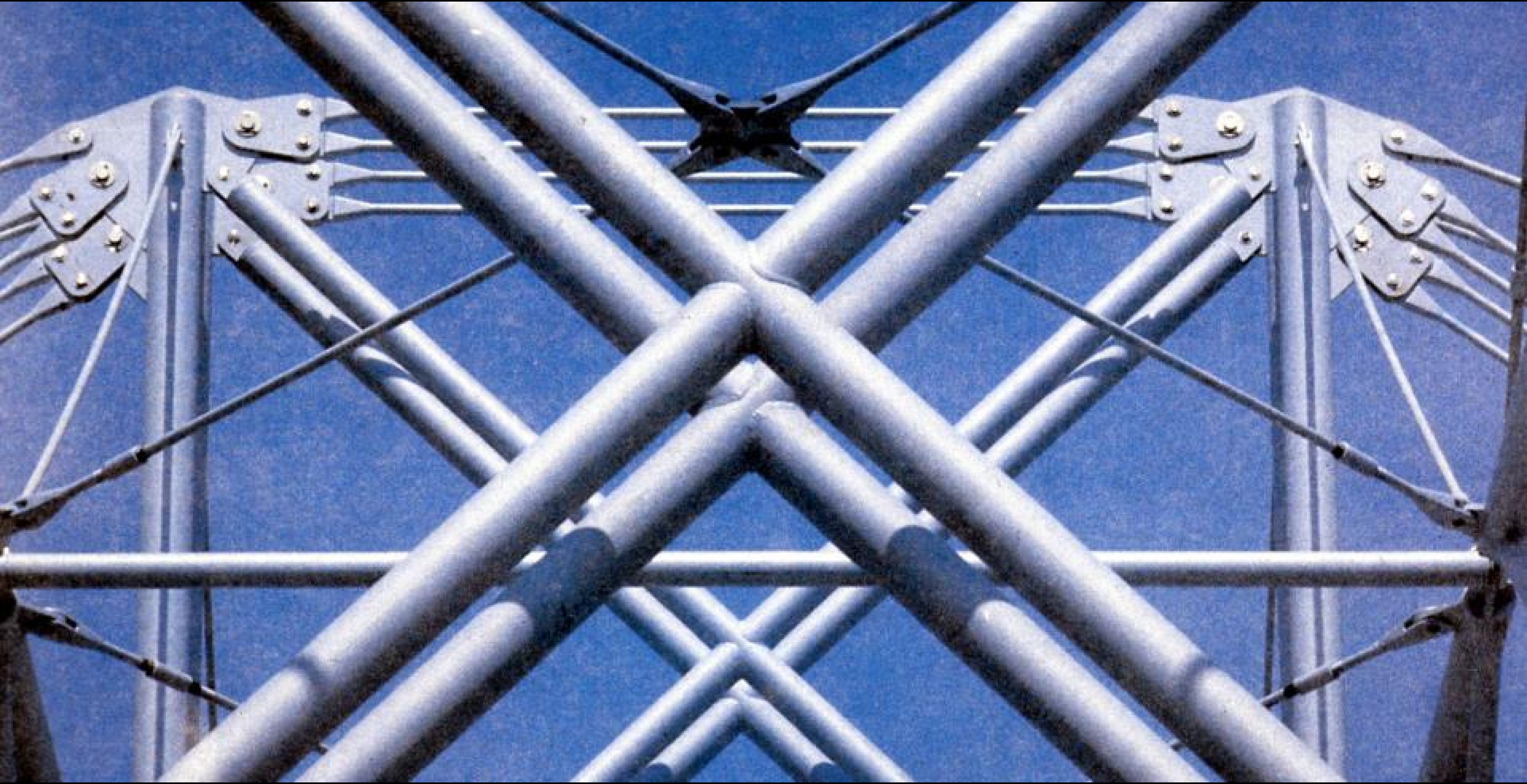
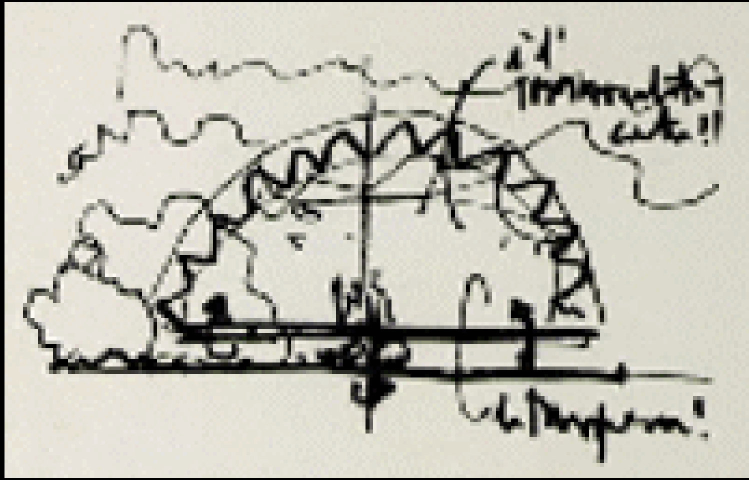
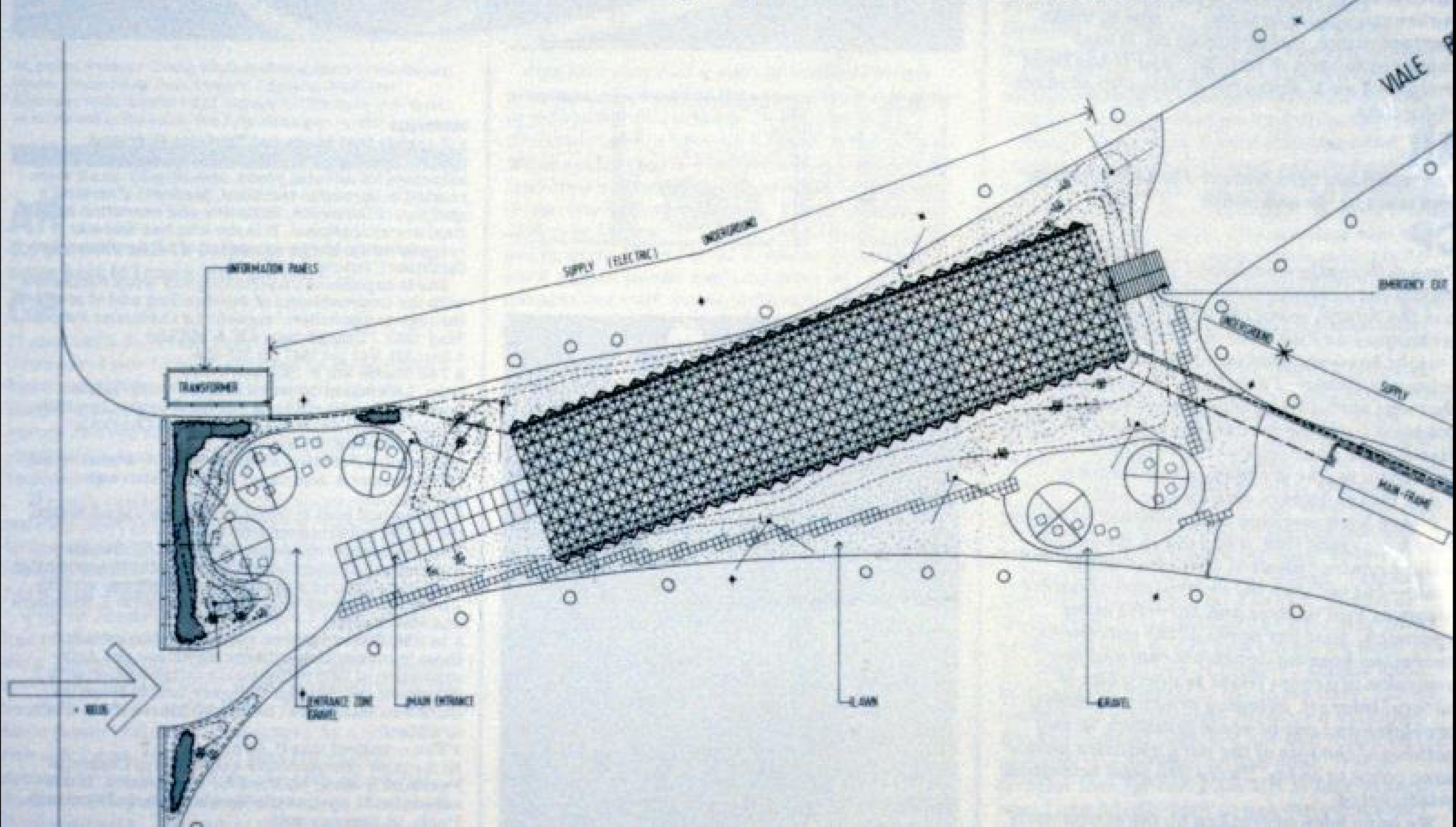



Oxford Ice Rink
Oxford, England
Grimshaw Architects
1984

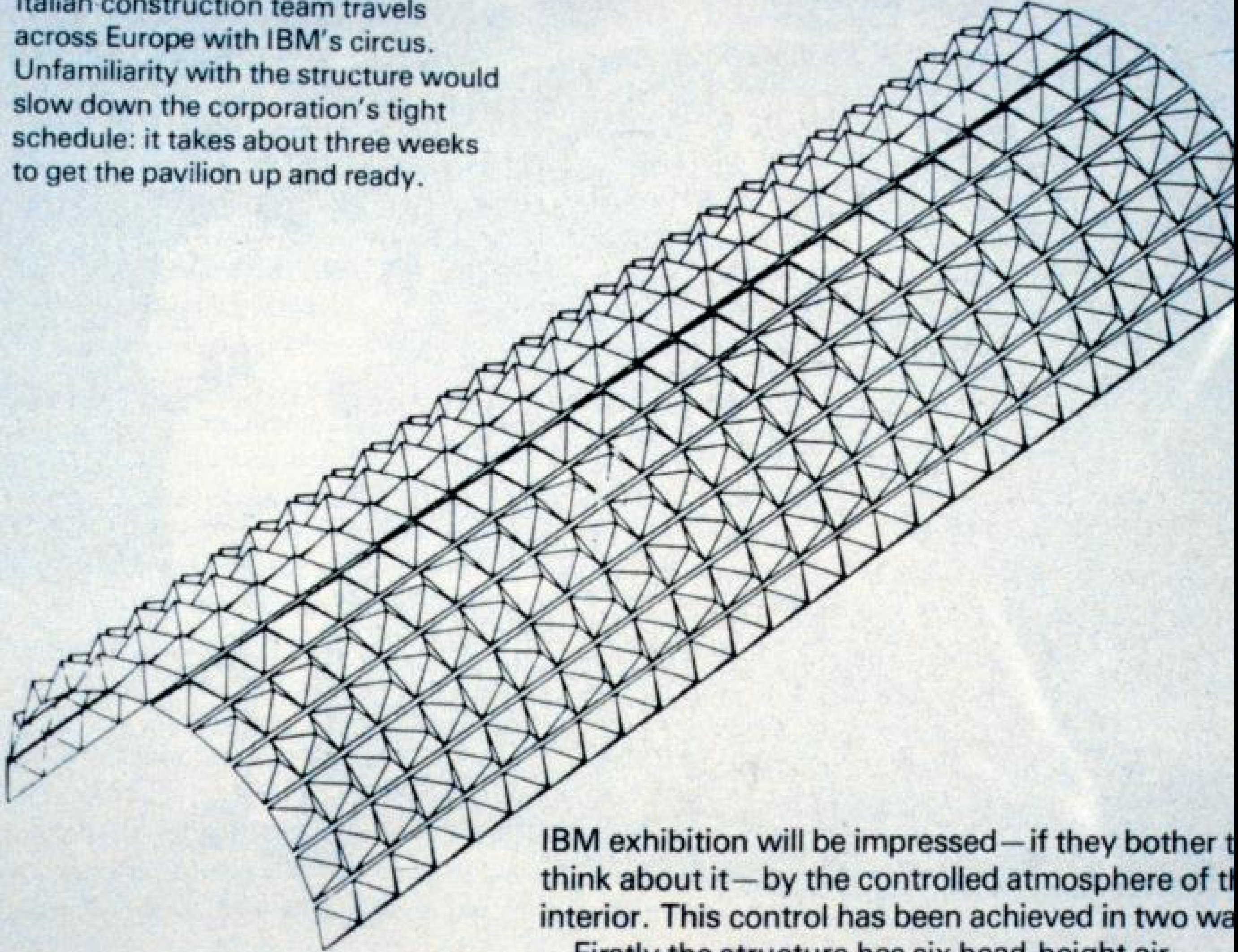


IBM Traveling Pavilion
All over Europe
Renzo Piano
1982-1986

IBM's intriguing exhibition for children and students has just opened in the grounds of the Natural History Museum, London. Designed by Renzo Piano, this pre-packed portable structure has travelled across the Channel from Paris and Milan. But treating a sophisticated building as a product for the export market was not as straightforward as the architects had imagined, as Jonathan Glancey found out.



Italian construction team travels across Europe with IBM's circus. Unfamiliarity with the structure would slow down the corporation's tight schedule: it takes about three weeks to get the pavilion up and ready.



IBM exhibition will be impressed—if they bother t
think about it—by the controlled atmosphere of t
interior. This control has been achieved in two wa
Firstly the structure has six head-height air-

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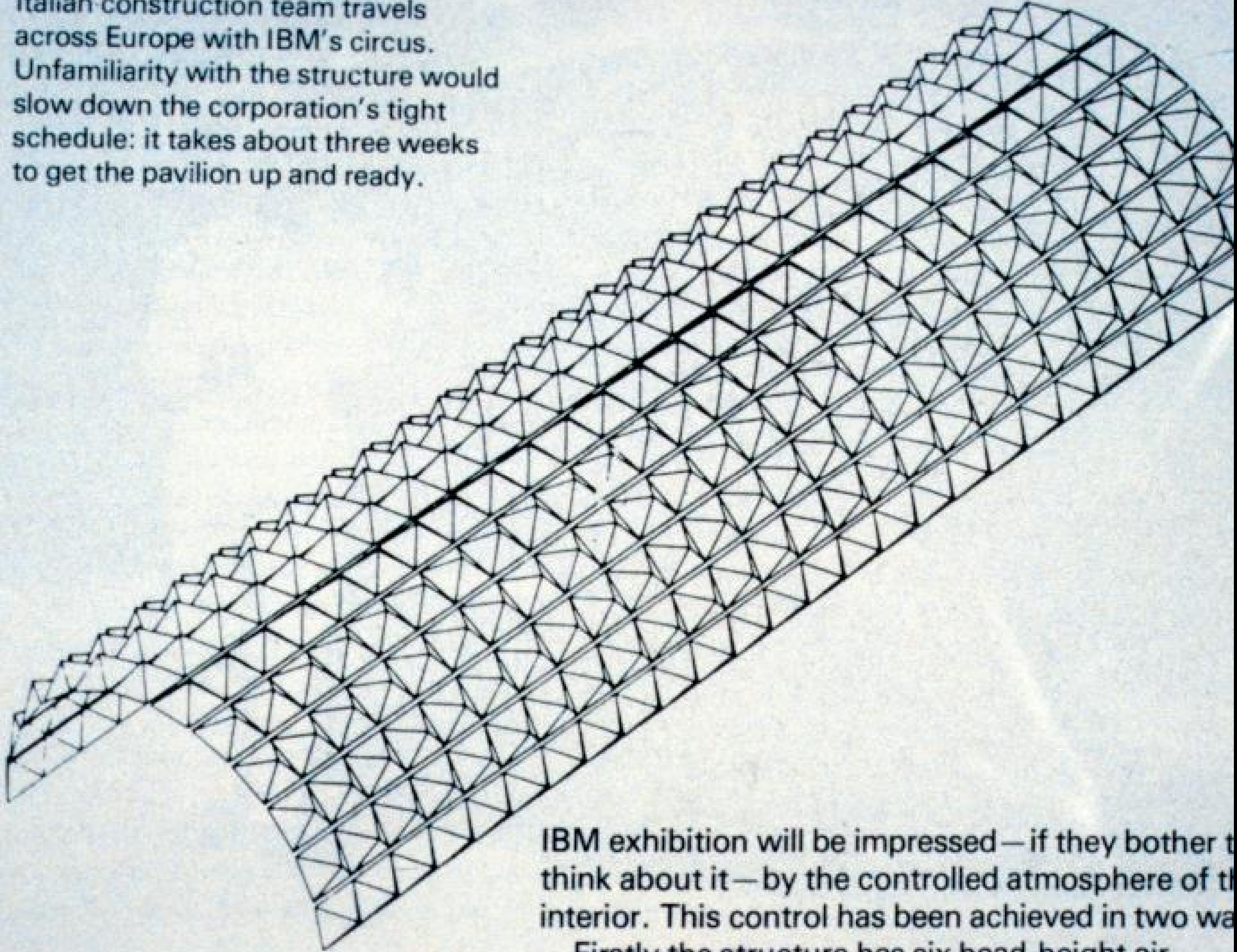

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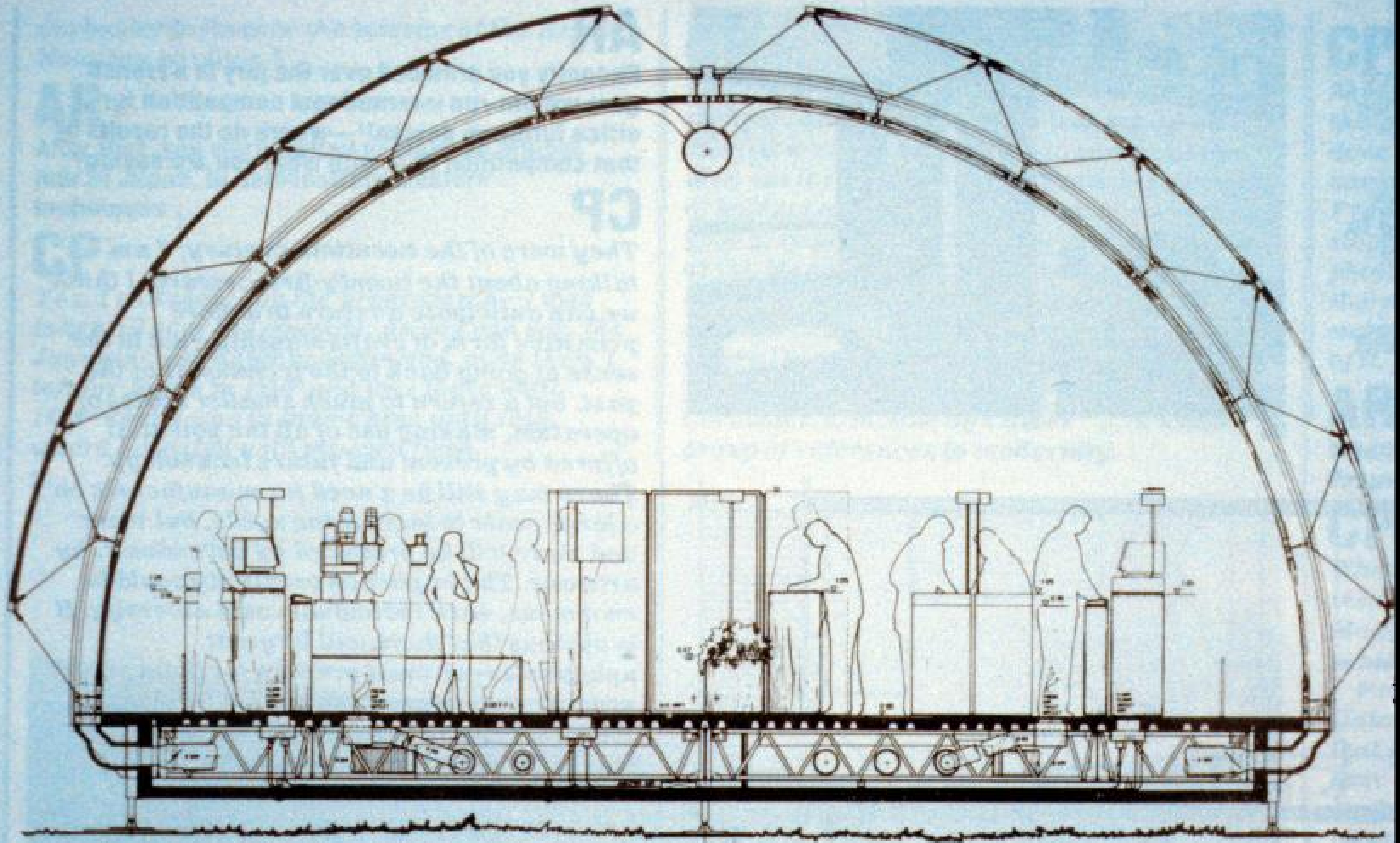
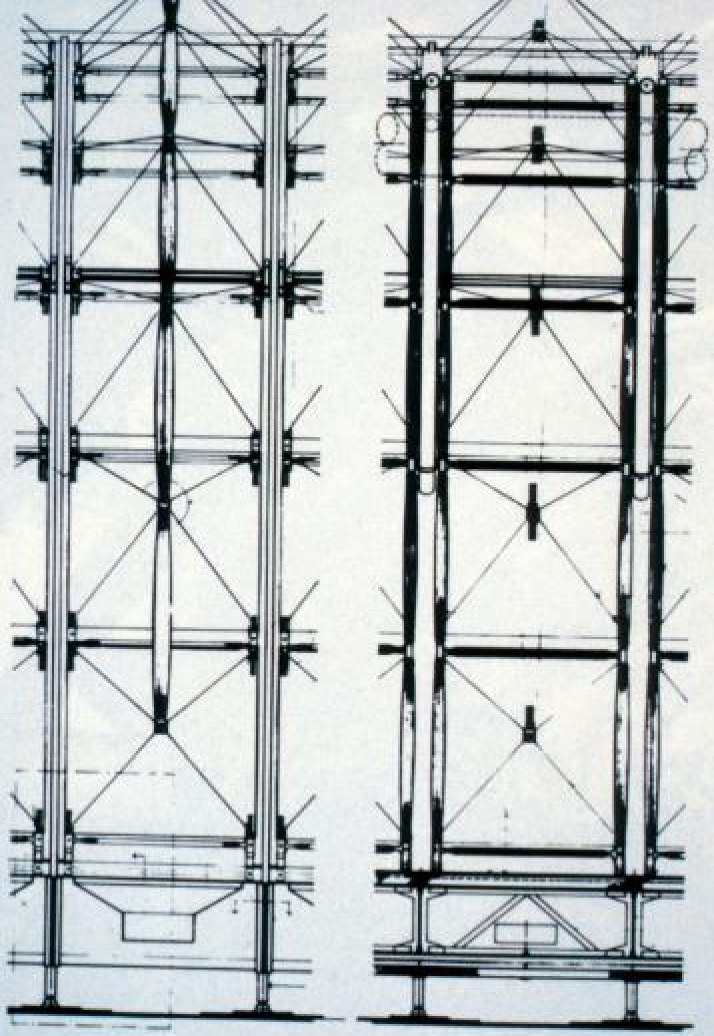
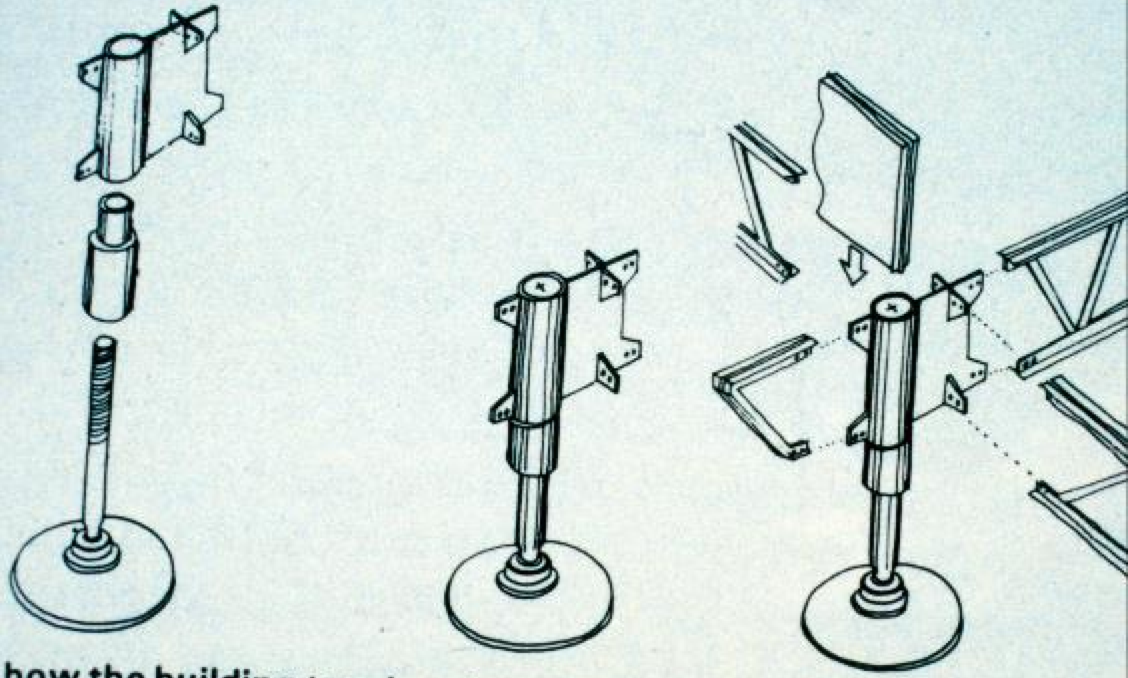


section showing structural and air-conditioning systems



72|11



how the building touches down: adjustable feet

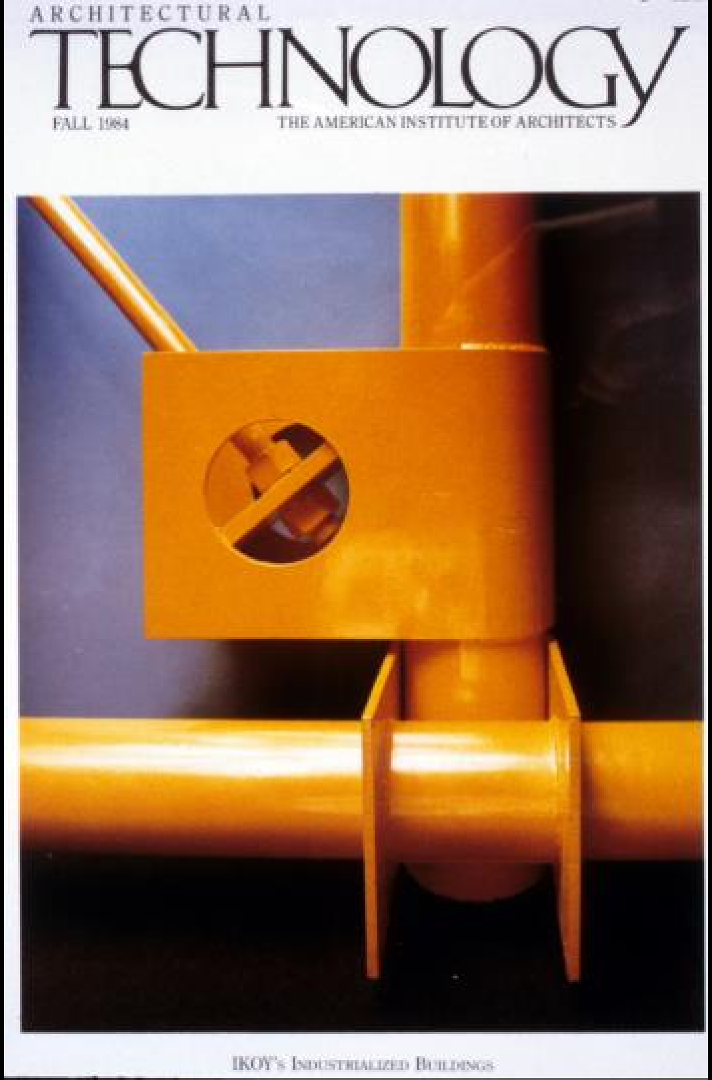


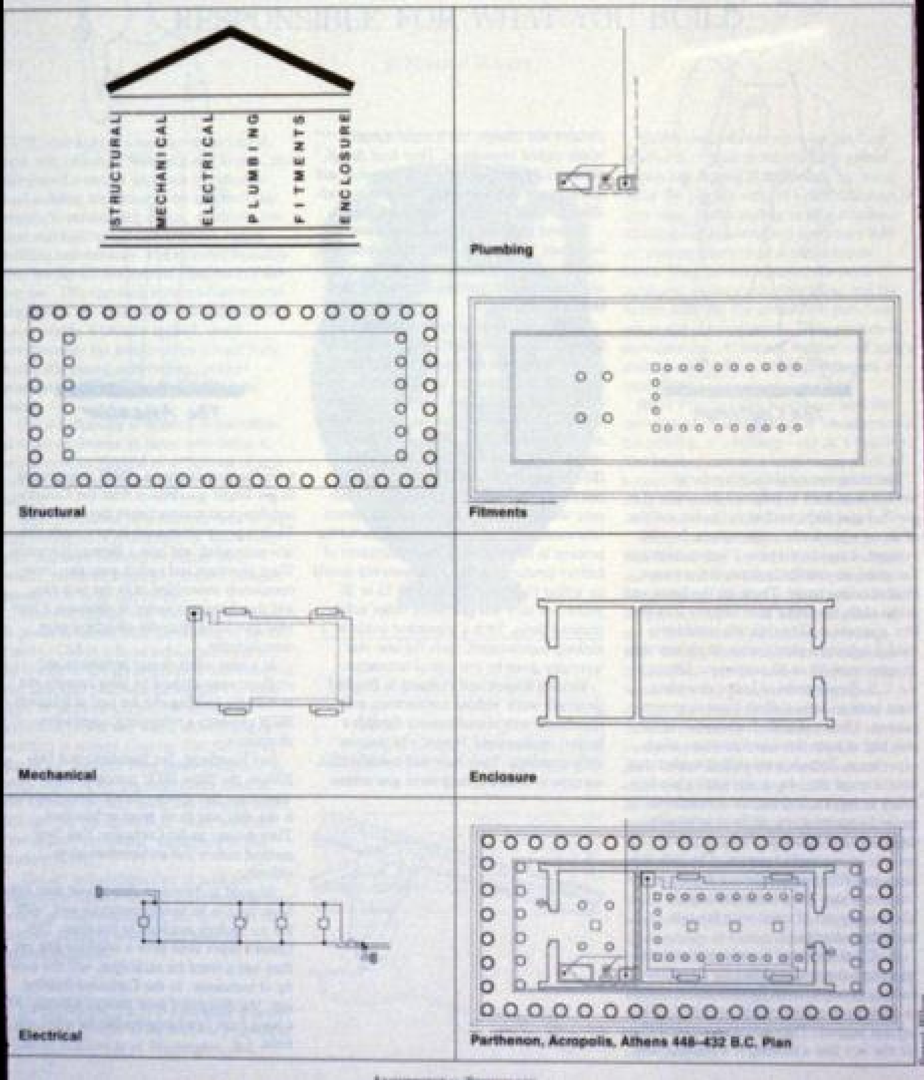


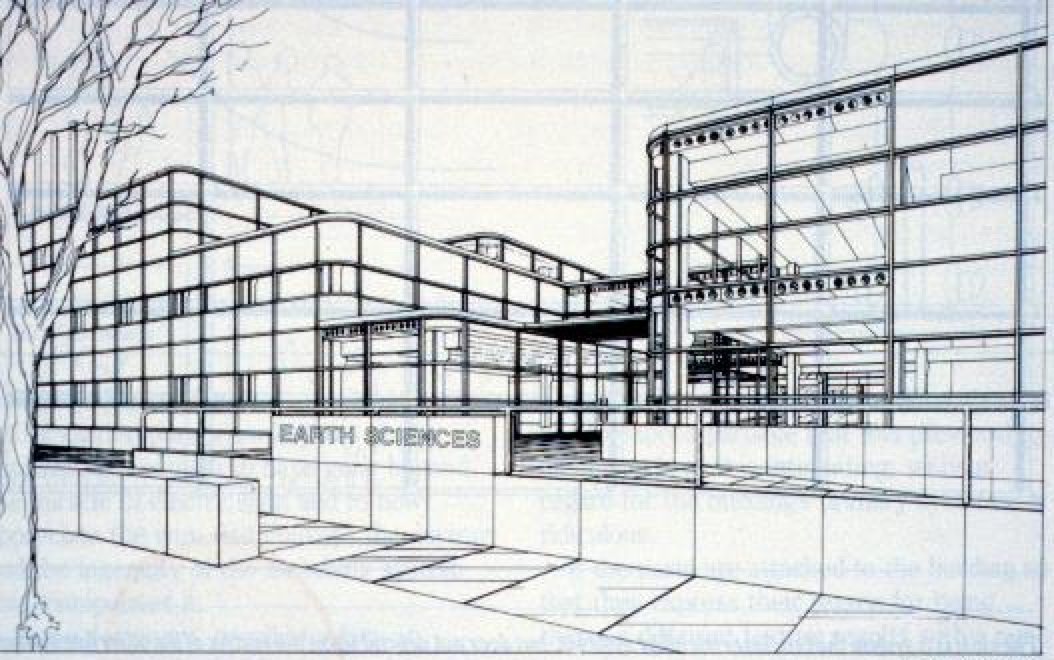

IKOY Architects
Founded 1968

Was interested in "systems buildings"
A combination of custom components
and off-the -shelf

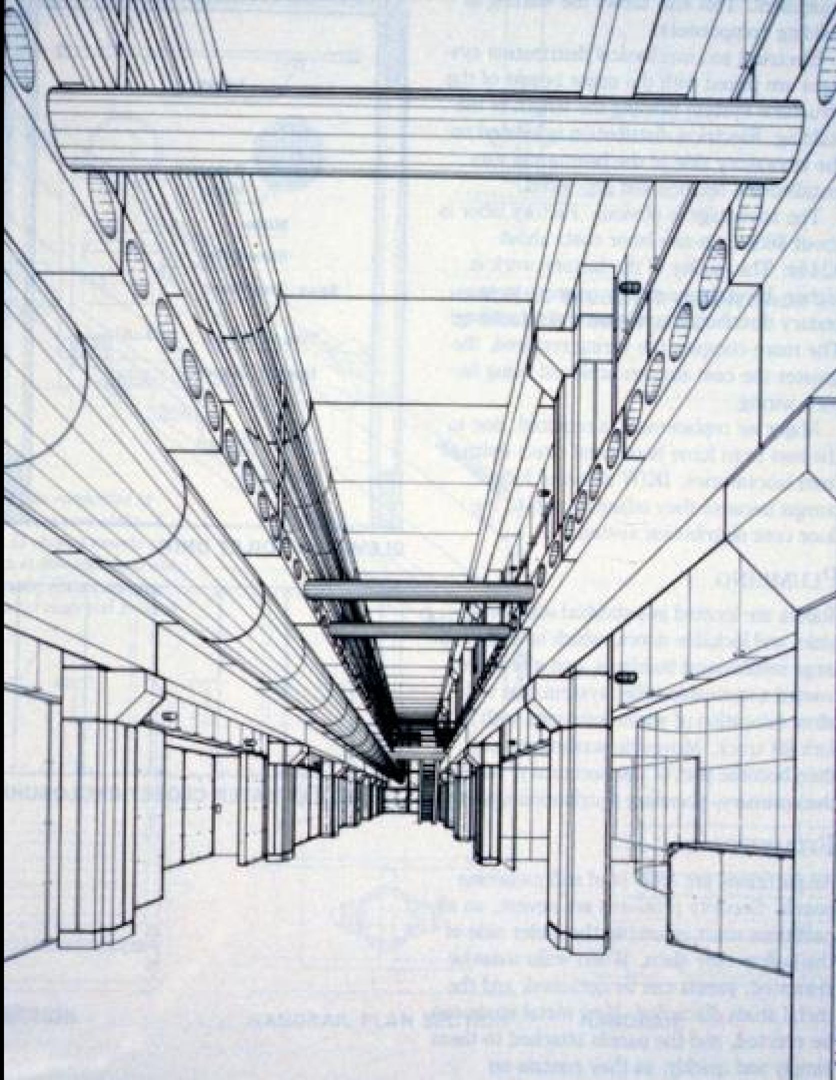
Ron Keenberg, one of the principles,
taught at UWSA in the late 1980s

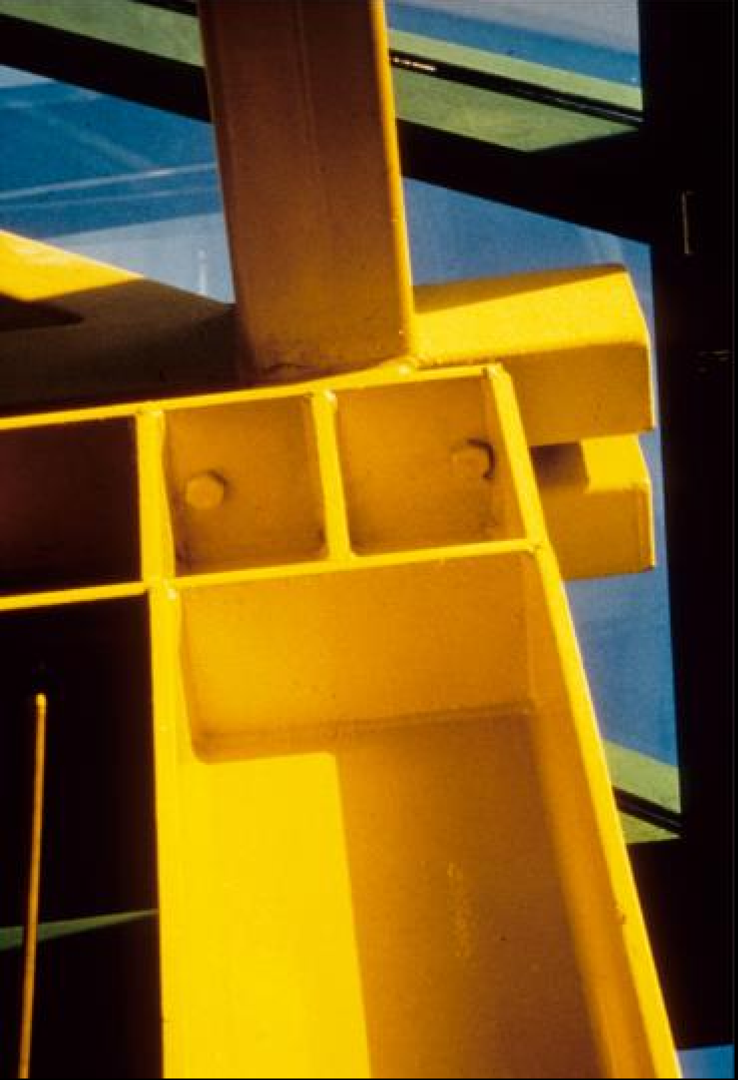

ARCHITECTURAL
TECHNOLOGY
FALL 1984
THE AMERICAN INSTITUTE OF ARCHITECTS
IKOY's Industrialized Buildings


STRUCTURAL
MECHANICAL
ELECTRICAL
PLUMBING
FITMENTS
ENCLOSURE
Plumbing
Structural
Fitments
Mechanical
Enclosure
Electrical
Parthenon, Acropolis, Athens 448–432 B.C. Plan



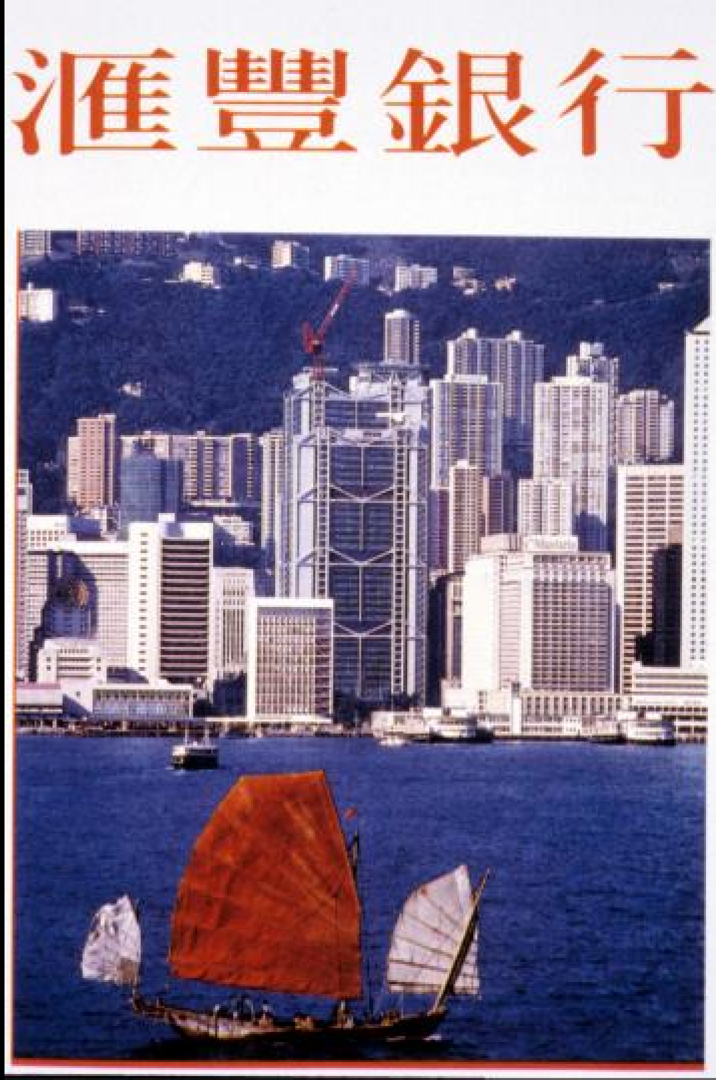
IKOY Architects





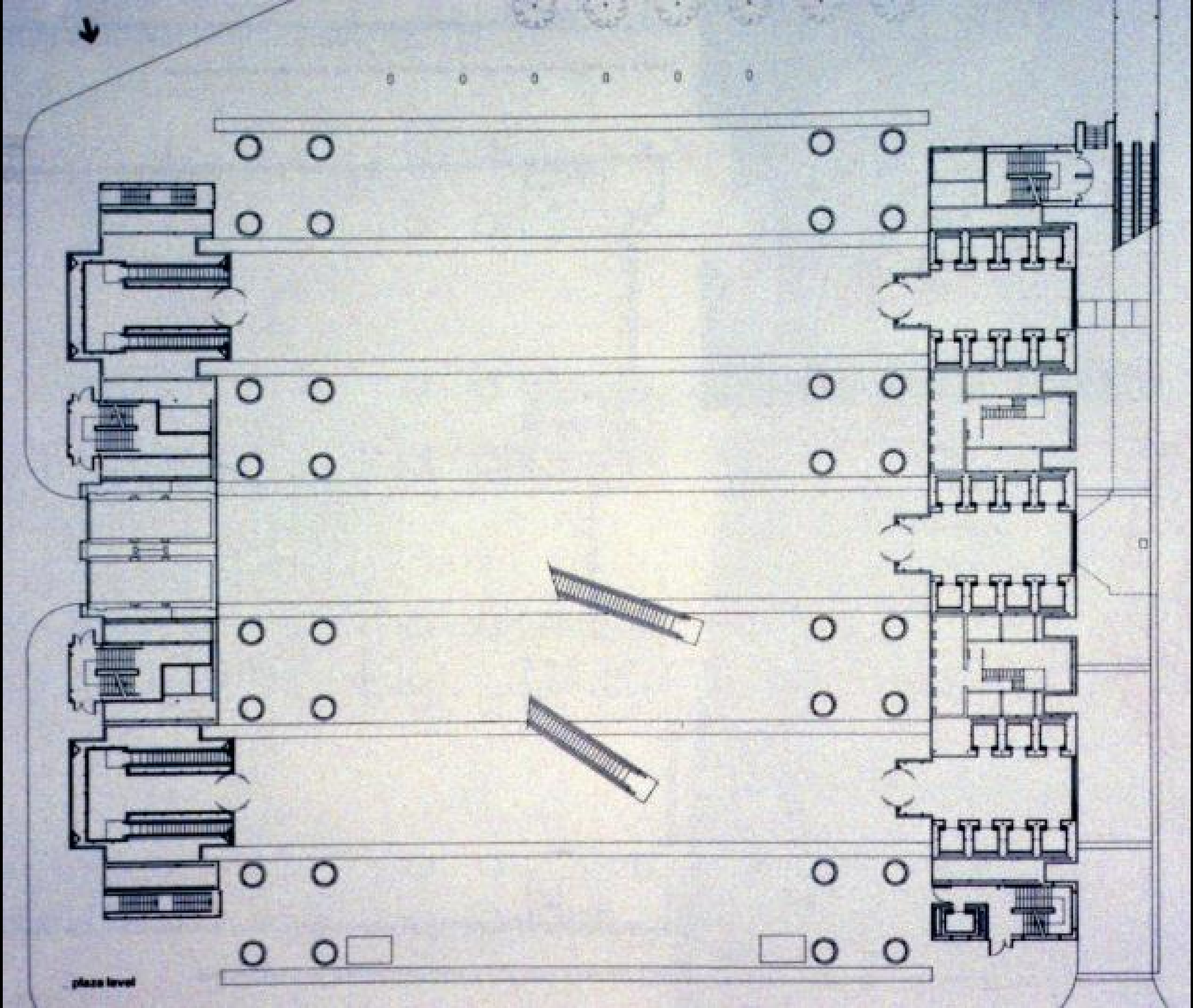
Intumescent fire protective coating

The Hong Kong
and Shanghai Bank
Hong Kong
Foster + Partners
1985

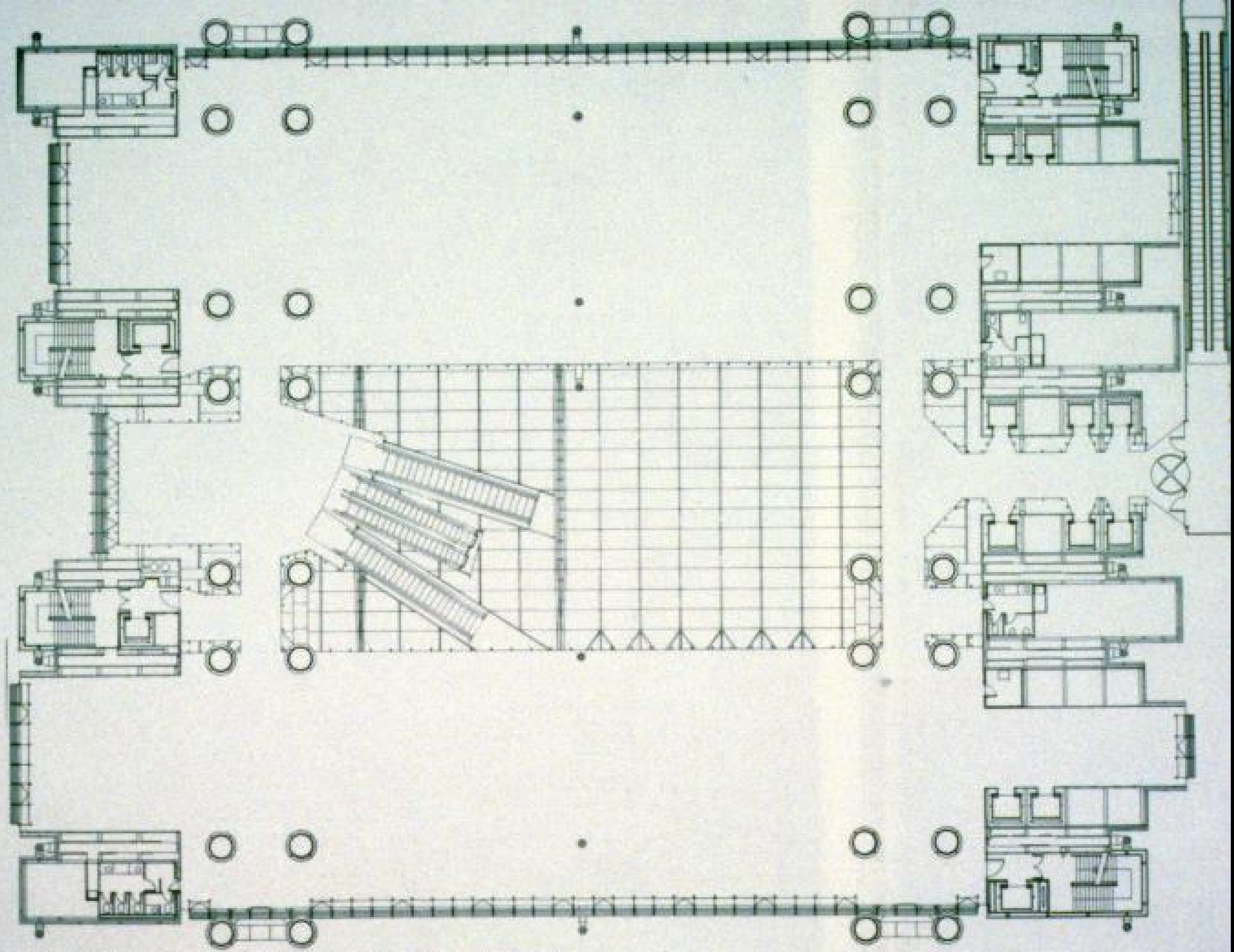




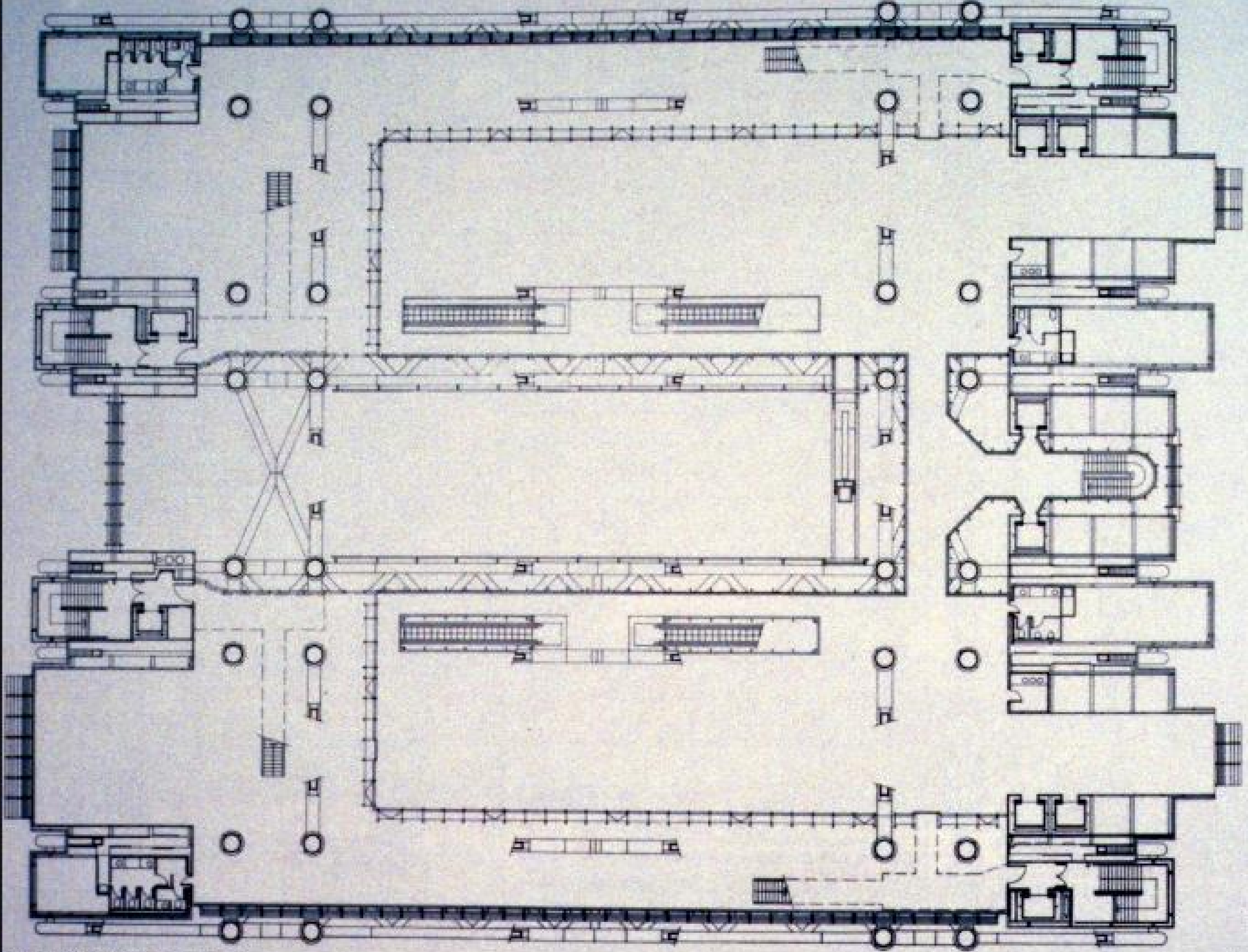
www.GreatBuildings.com



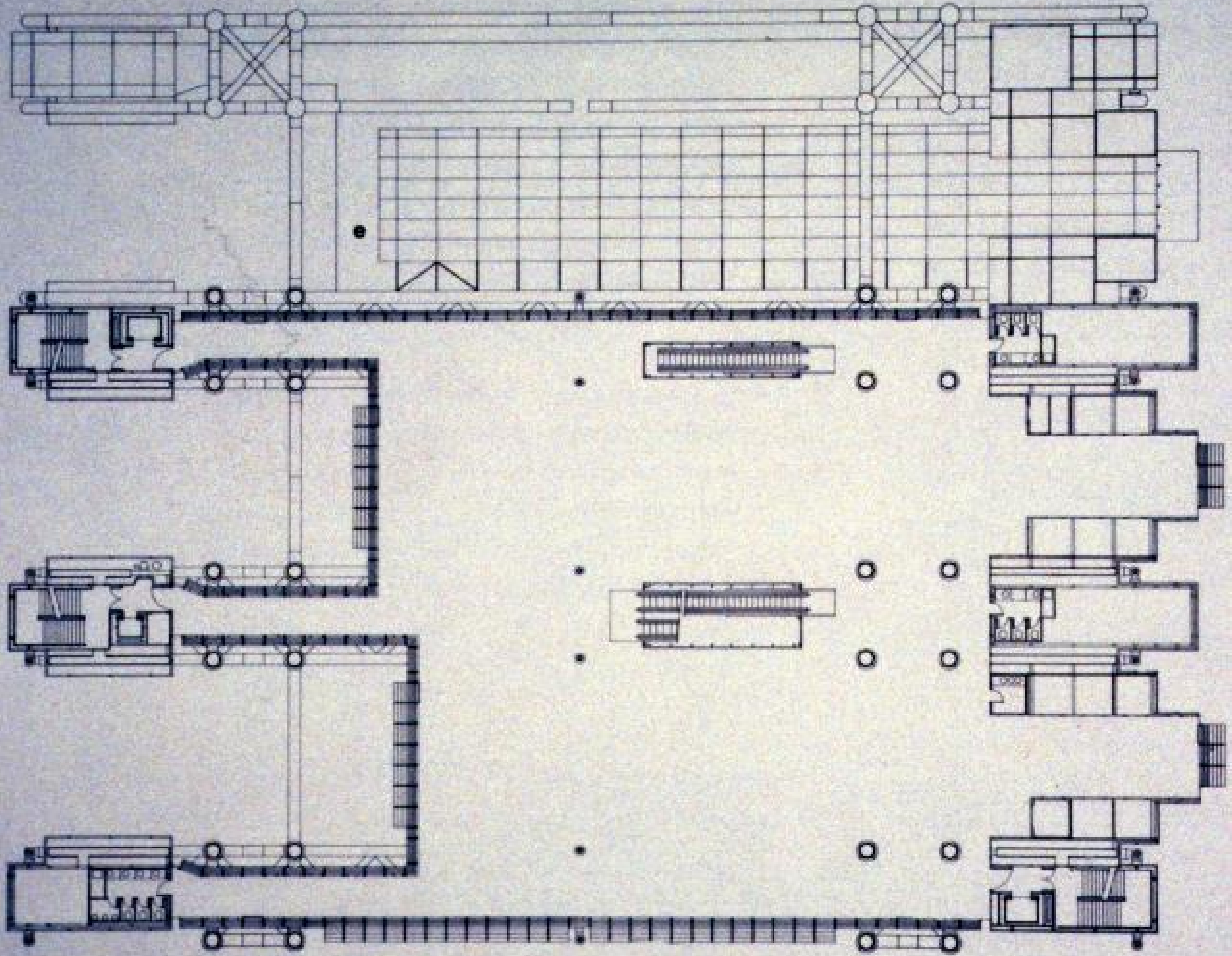
plaza level



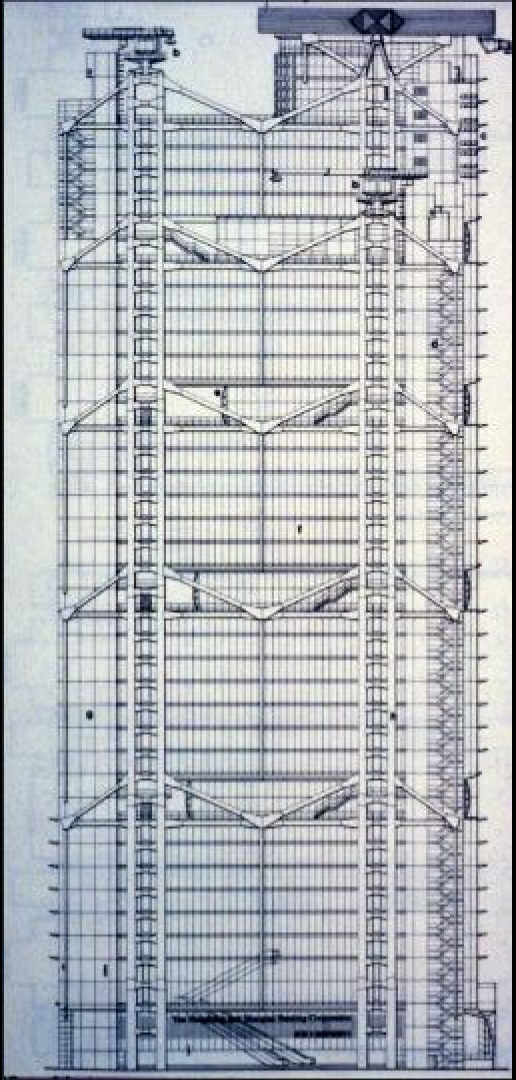
level 3: first level of banking hall at which public arrives on escalators from plaza

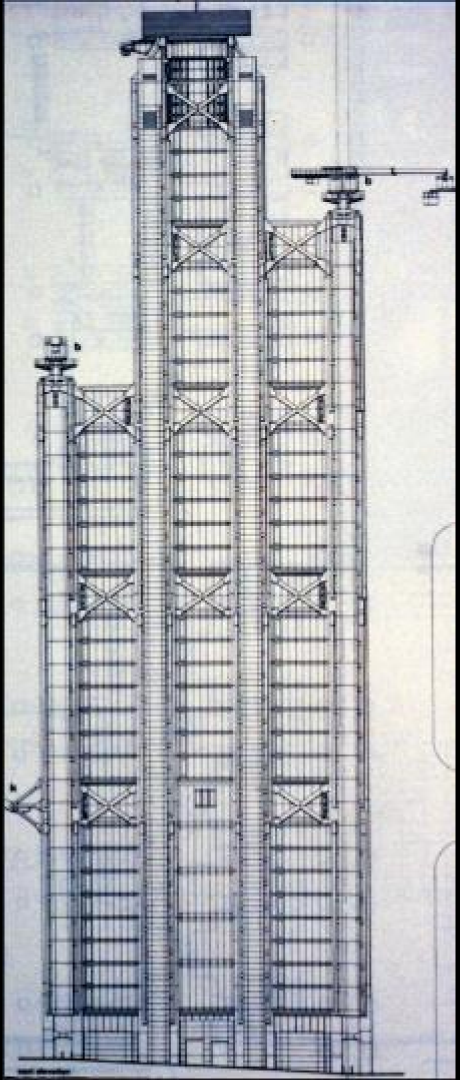


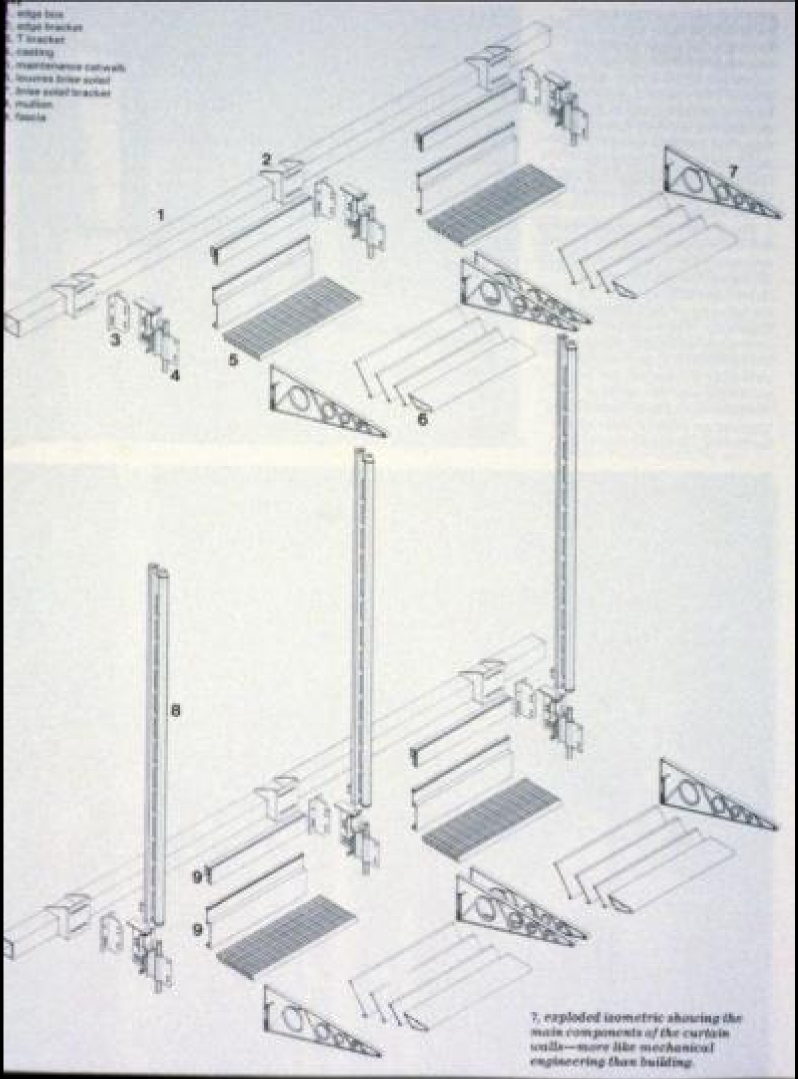
level 11: double height at top of atrium



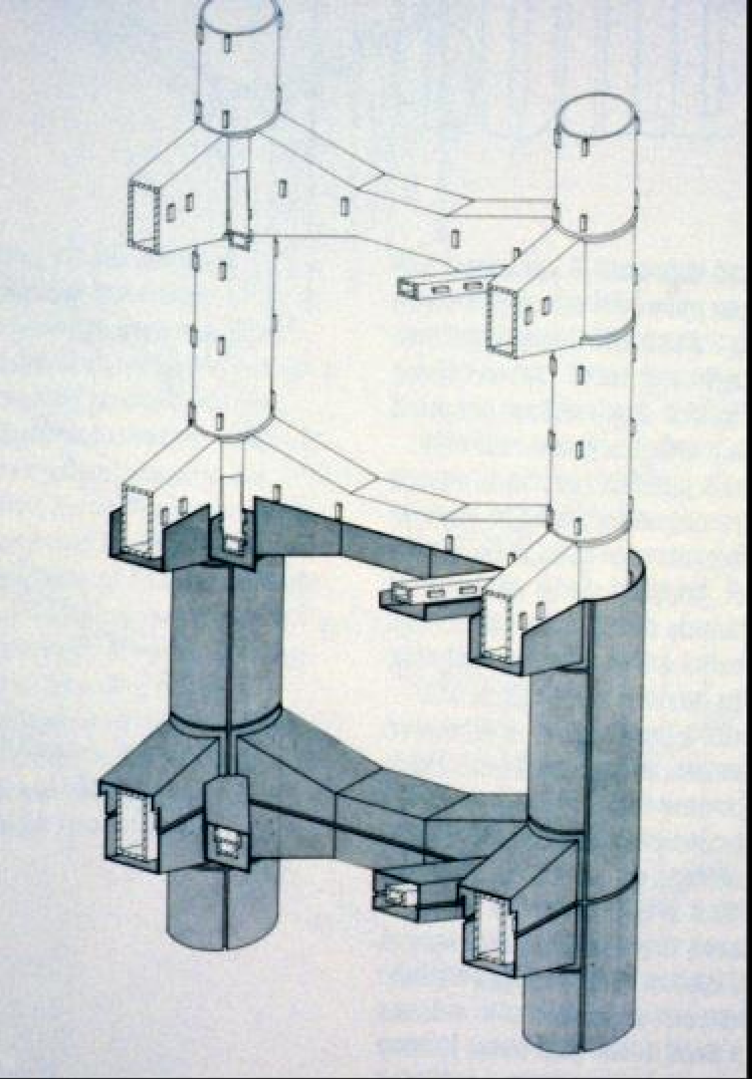
level 30: bulk of building is eroded by light angle requirements







7, exploded isometric showing the main components of the curtain walls—more like mechanical engineering than building.



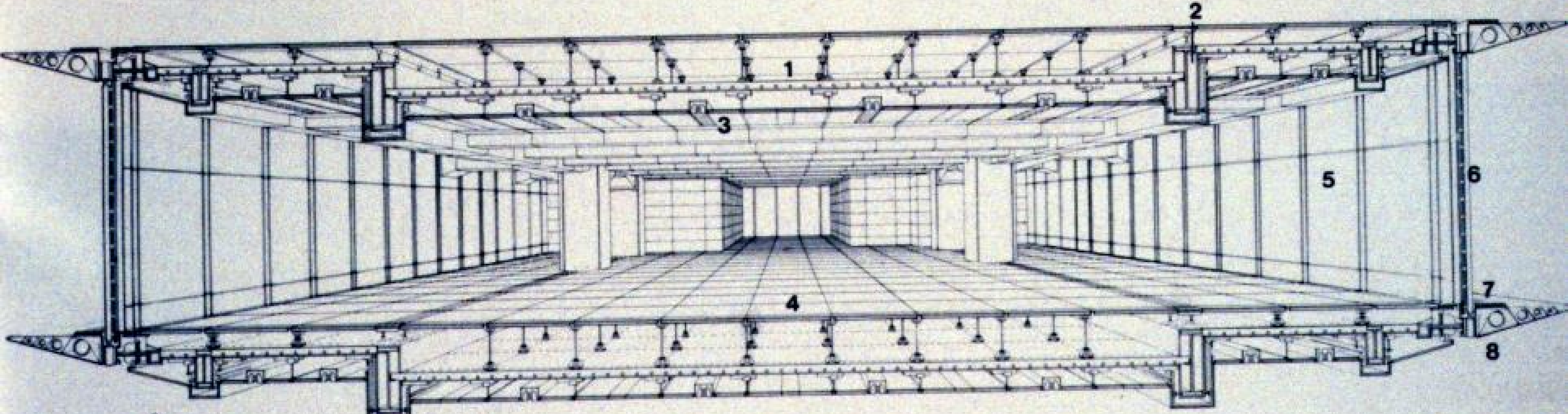
1

1, isometric section showing the floors cut back between masts on the east side of the building.

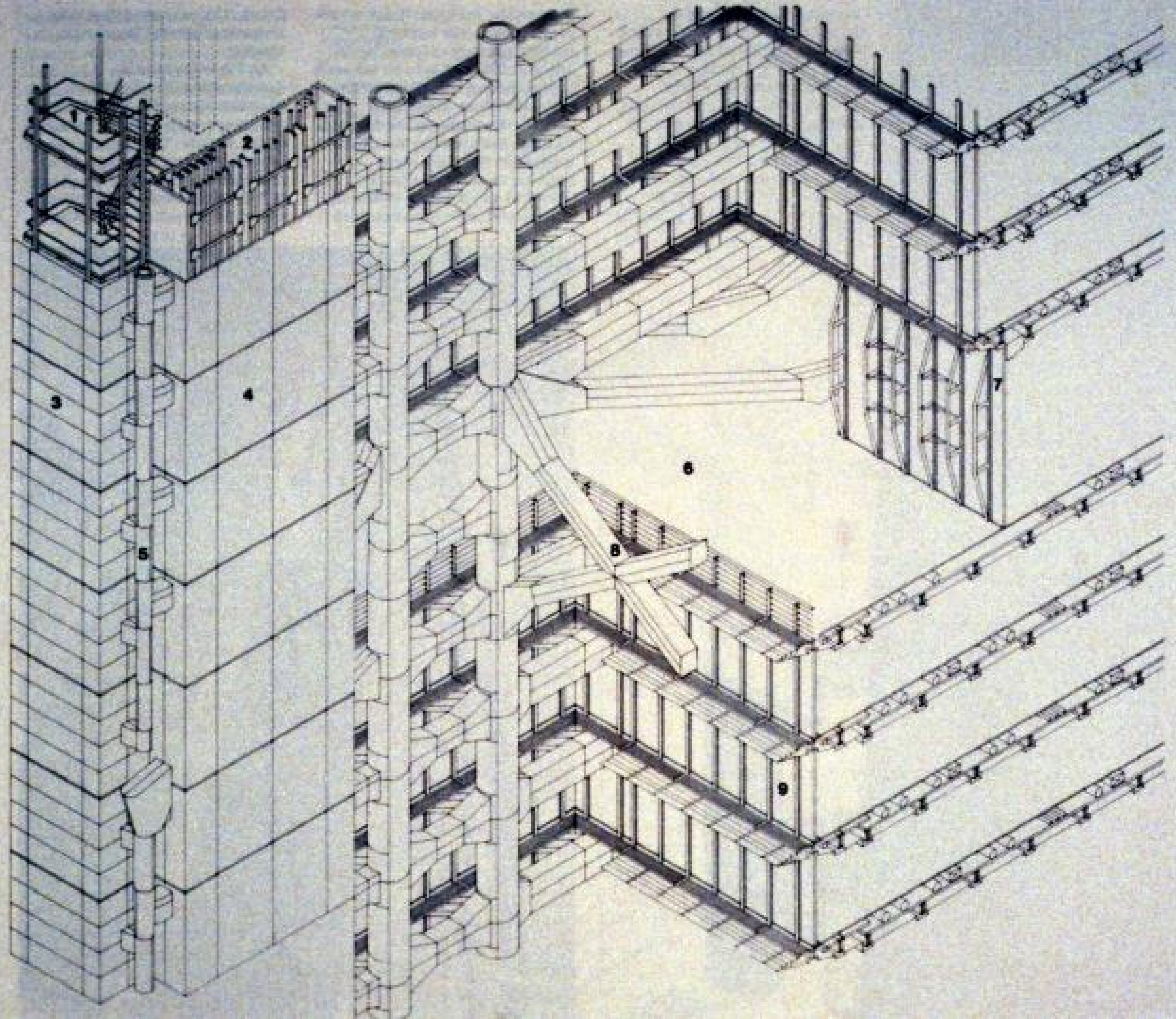
key
1, stairs
2, risers
3, glass grid wall
4, panel wall
5, outer hanger
6, terrace
7, trussed mullion
8, n/s cross bracing
9, typical curtain wall

2, section through a one-bay wide floor.

key
1, 100 mm concrete slab
2, primary beam
3, lighting
4, raised floor
5, back-up wall
6, typical curtain wall
7, catwalk
8, *brise soleil*

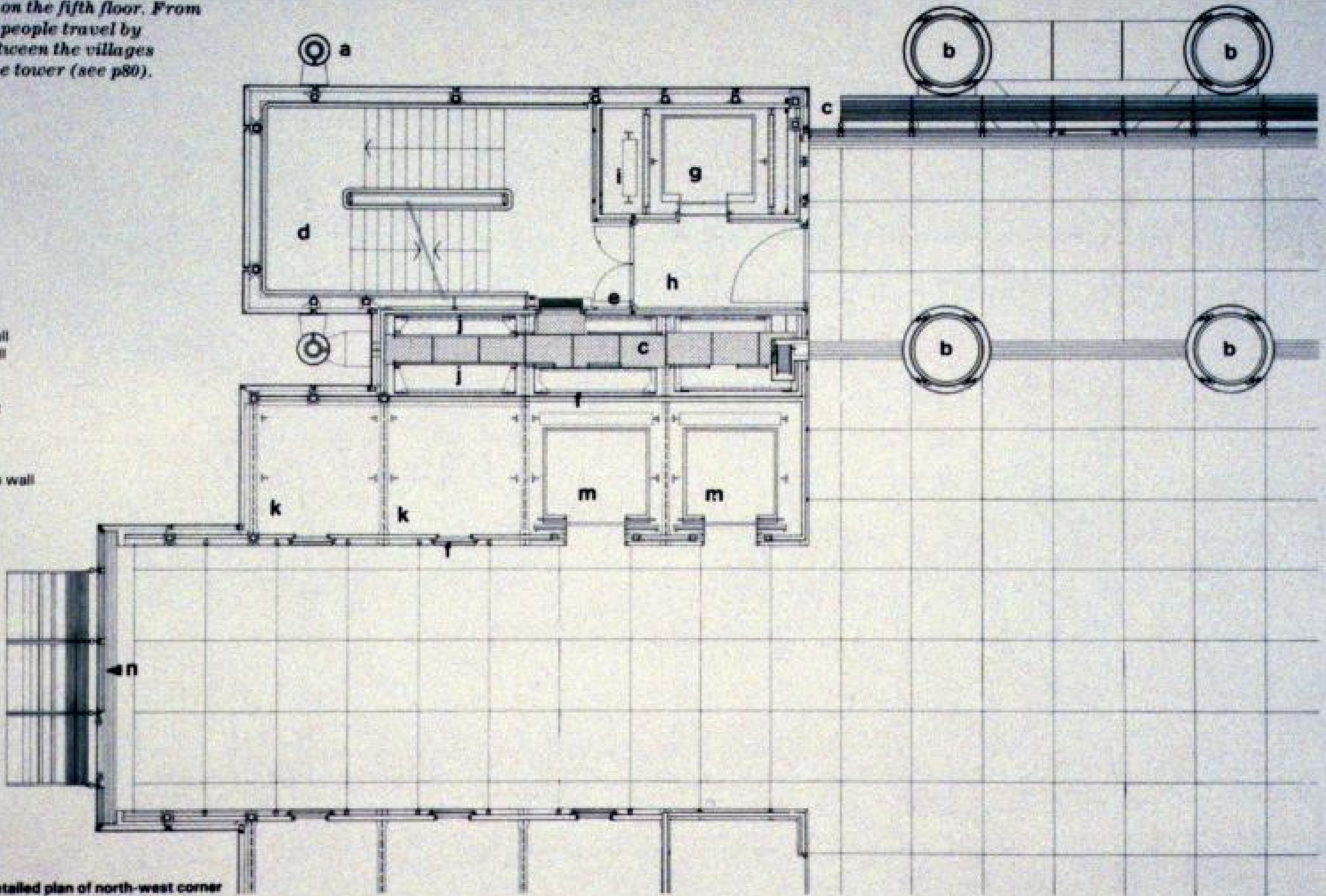


2



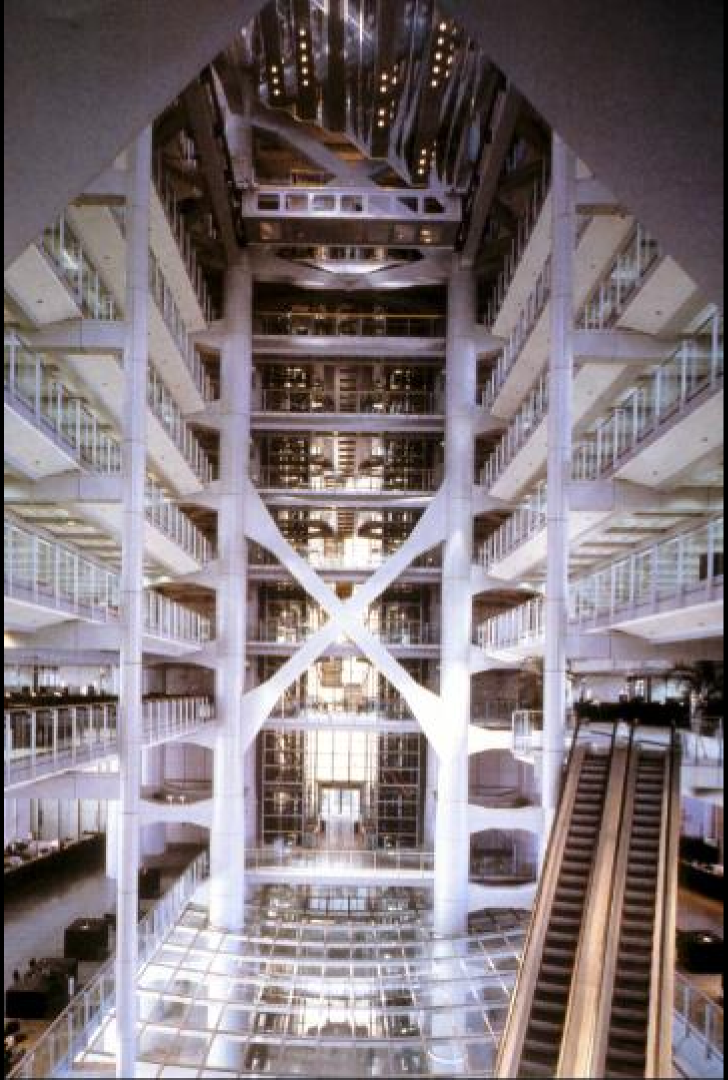
1
2
3
4
5
6
7
8
9

20, lift lobby on the fifth floor. From such lobbies people travel by escalator between the villages stacked in the tower (see p80).



key
a, hanger
b, tubular mast
c, catwalk
d, stairs
e, 1-hour fire wall
f, 2-hour fire wall
g, goods lift
h, escape lobby
i, counterweight
j, riser
k, lift shaft
m, lift
n, typical curtain wall

detailed plan of north-west corner



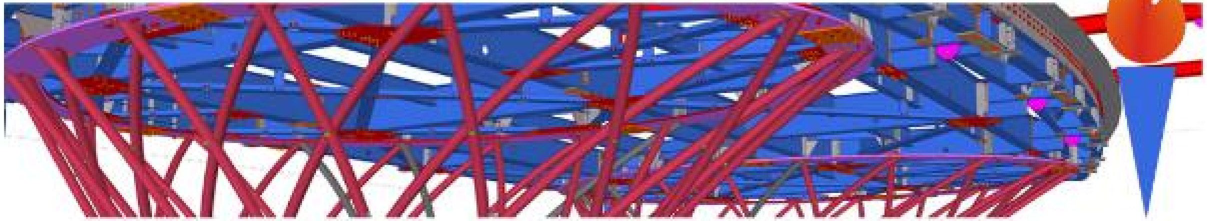



HSBC


To be continued….

If you take Arch 570: Architectural Steel Design as an elective later on!

http://tboake.com/SSEF1/index.shtml



HOME SUB MENU

- Project Introduction
- Using the 3D PDFs
- About the Authors
- References and Links
- Site Index
- Legal Disclaimer

Fun is in the Details: Innovation in Steel Connections

A Curriculum Materials Project

Welcome to **"Fun is in the Details: Innovation in Steel Connections"!** This curriculum materials project has been funded by the **Steel Structures Education Foundation** the former educational arm of the **Canadian Institute of Steel Construction** (CISC).

The web site is structured into *SEVEN primary sections on CONNECTION DESIGN* that will take you through the understanding and development of steel connections. Navigation is accessible at the top of each page, with subheadings for each section available in the left sidebar or through the pull down menu at the top.

Basic Connections	Steel Framing	AESS	Innovative Connections	Historic Projects	Contemporary Projects	Finishes

This web based project is designed to increasing the understanding of connection design in steel structures to better assist students of architecture and engineering in creating more convincing and compelling structures. The project looks at how to take basic methods of creating connections and transform them into innovative connections, using similar principles. Although Standard Structural Steel connections will be included, the emphasis will be on an exploration of Architecturally Exposed Structural Steel (AESS). The project will reference the new CISC AESS documents, in particular the " Category Matrix " and "CISC Guide for Specifying Architecturally Exposed Structural Steel ".

Please check out my Facebook page for AESS . Many more projects there!